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THE SOUTH'S DEVELOPMENT

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MANUFACTURERS RECORD

PUBLISHED EVERY THURSDAY BY THE

MANUFACTURERS RECORD PUBLISHING COMPANY
BALTIMORE

ISSUED THIS WEEK IN TWO PARTS—PART II

BALTIMORE, DECEMBER 11, 1924

THE SUBSCRIPTION PRICE OF THE MANUFACTURERS RECORD IS $6.50 PER YEAR IN ADVANCE

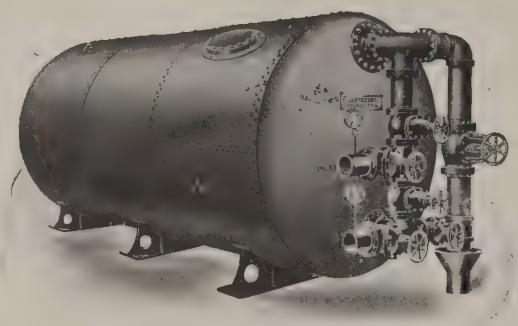
RICHARD HATHAWAY EDMONDS

Editor and President, Manufacturers Record

FIFTY YEARS ago this fall Richard Hathaway Edmonds began his newspaper work. Great changes have come about in the South during that time. From a country just emerging from the desolation of war it has grown to a land of plenty. Its resources and opportunities for development are unmatched elsewhere in the world. It seems appropriate, therefore, that with the rounding out of fifty years of work for the South by its editor, the Manufacturers Record should take this occasion to assemble in a special edition the facts as to what the South has, what it has accomplished and what it may be expected to accomplish in the future.

The Manufacturers Record was started by Mr. Edmonds forty-two years ago, growing out of a commercial and financial paper established in 1850, of which Mr. Edmonds was for several years Associate Editor. From the time of its beginning, Southern interests, Southern development, Southern resources have been its theme. It has been the unswerving advocate and exponent of the South as the Nation's greatest asset.

PURE WATER



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ONE of the greatest contributing factors to the South's Development has been an adequate supply of clear, clean water for all domestic and industrial requirements obtained by the use of purifying equipment.

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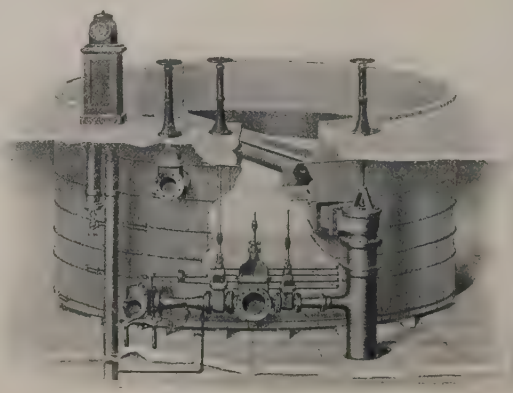
Write us in connection with your particular filtration problem. We shall be pleased to give your inquiry individual attention.



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Augusta-Jacksonville THE BON-AIR SPECIAL Through Pullman Service

Southern Railway Shops, Birmingham, Ala. (Portion of Locomotive Erecting Shop shown.)
Aggregate Size 1,800' x 200'; 4,150 tons Steel.
Dwight P. Robinson & Co., New York, Constructing Engineers.

Forward, March!

OUR PAST AND PRESENT

Incorporated October 28, 1895, with a small plant at Roanoke, Va., which has grown steadily until today it is the largest steel fabricating plant south of Pennsylvania.

In 1909 we built a plant at Memphis, Tenn., to serve the Mississippi Valley and Southwest.

Our Birmingham plant was established in April, 1922, and with Memphis has enjoyed continued growth and progress.

We Design,
Manufacture *and* Erect
Steel Structures
of all kinds
Bridges and Girders
Turntables
Viaducts
Office and Store Buildings
Industrial Buildings
Crane Runways
Warehouses, Etc.

FROM the Plantation of sixty years ago to a section today of vast resources and enterprise, there unfolds a picture of wonderful development.

The South has marched forward with giant strides.

There is every promise for the future of still greater advancement and progress.

As our big railroads and industries are doing, so in all lines of activity there should be renewing and enlarging of facilities so that all may move forward to greater and more stable prosperity.

Virginia Bridge & Iron Co.

Roanoke Memphis Birmingham Atlanta
New Orleans Dallas Los Angeles

Works at Roanoke Memphis Birmingham

Virginia Bridge
STEEL STRUCTURES

PANORAMIC VIEW OF A SECT

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THERE is listed on the opposite page some of the products of our manufacture, which represent the highest standard of excellence.

We offer exceptional facilities and take pride in the service we are able to render our customers.

It is a pleasure and a privilege to answer inquiries.

LARGEST BLAST FURNACE PLANT IN THE SOUTH

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Rolled from Open Hearth Steel.

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25 to 48 lbs. per yard, rolled from new Open Hearth Billets.

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Airplane View Showing Part of Bethlehem's Immense Works at Sparrow's Point, Md., Twelve Miles South of Baltimore.
The Bethlehem Interests in the Baltimore District Comprise that City's Greatest Industry.

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for every purpose—in any quantity

THE products of Bethlehem Steel Company include iron and steel for the manufacture of practically every kind of iron and steel commodity, as well as a large number of finished products ranging from the smallest wire nail to large Diesel-type oil engines of several thousand horsepower.

The great variety of equipment at the Bethlehem plants and the highly specialized manufacturing and technical organizations of the Company enable us to supply iron and steel in large tonnages, or to furnish with equal facility highly specialized products requiring individual and unusual attention where only small quantities are needed.

Control of the raw materials for each product, and the application of the most efficient methods of manufacture, have been important factors in the maintenance of high quality in Bethlehem products.

Plants at Sparrow's Point and Baltimore, Md.; Bethlehem, Steelton, Lebanon, Reading, Johnstown, and Coatesville, Pa., and Lackawanna, N. Y.

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Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

TAYLOR-WHARTON IRON & STEEL CO.

Wm Wharton, Jr. & Co. Inc. Philadelphia Roll & Mach. Co.
Tioga Steel & Iron Co.

WITH this issue a useful journal pauses in its routine work to look back and sum up the expansion of the South; expansion built upon a most secure foundation—its own resources. ¶ We are glad to be represented in an issue devoted to retrospection; for, inasmuch as this is an advertisement, it will be consistent for us to recount our own expansion. ¶ In 1752, when Baltimore boasted of twenty-five houses and a population of two hundred, Taylor-Wharton Iron and Steel Company was nine years old. That is a long way back, but interesting business records have been preserved; from cannon balls to armor plate, this company has furnished munition for every war in which America has been engaged; thirty-two years ago Taylor-Wharton Iron and Steel Company poured the first heat of manganese steel ever produced in this country, and called it "Tisco." ¶ No matter where the products of the South are shipped, the cars ride on Wharton special track-work of "Tisco" manganese steel. The rock ballast is crushed by crushers equipped with "Tisco" jaw plates. The dippers of the steam shovels that cut the right-of-way are equipped with teeth made of "Tisco" manganese steel. Wharton cylinders for high-pressure gases are found in all industries of the South where gas is employed. ¶ The products of Taylor-Wharton Iron and Steel Company, and its subsidiary companies, are many and varied, but in the main they comprise wearing parts necessary for all kinds of heavy-duty machinery, railway track-work, cylinders for high-pressure gases, special forgings and the like. ¶ While many of the products are standard and have a more or less fixed sale year after year, the company pays special attention to the solving of difficult or unusual steel problems. A little booklet, "Putting the Right Steel on the Job," has been printed to illustrate and describe this phase of our business. We shall be glad to send a copy.

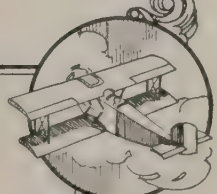
Special bulletins covering the following products are also available:

Gears and Pinions
Dipper Teeth
Gyratory and Jaw Crusher Parts
Mine and Skip Car Wheels
Chain and Sprockets
Steel Castings
Steam Shovel and Dredge Parts
Coal and Coke Handling Machines
Pulp and Paper Mill Castings
Special Railway Track-work
Cylinders for High-Pressure Gases
Hollow Rollers for Conveying Purposes

Taylor-Wharton Iron and Steel Co.

HIGH BRIDGE, NEW JERSEY

Sole owner of the Hibbard-Howe patents covering basic processes for the electric manufacture of manganese steel



Taylor-Wharton Iron & Steel Co.	Wm. Wharton Jr. & Co.	Tioga Steel & Iron Co.	Phila. Roll & Machine Co.
Plant at High Bridge, New Jersey	Plant at Easton, Pennsylvania	Plant at Philadelphia, Pennsylvania	Plant at Philadelphia, Pennsylvania
Manganese Steel Wearing Parts	Special Trackwork Cylinders for Gases	Hammered and Pressed Forgings	Rolls and Rolling Mill Machinery

A NEWPORT CULVERT AIDING IN THE GOOD ROADS MOVEMENT OF THE SOUTH

THE wonderful development of the South has been made possible and is being made more rapid by the wonderful growth in sentiment in favor of good roads.

The construction of good roads depends entirely upon the use of good material. We, therefore, take considerable credit to ourselves in the South's development by reason of the tact, that for the past fourteen years we have been selling to the progressive road builders of the South our "GENUINE OPEN HEARTH IRON" culverts than which there are no better made anywhere today.

Wherever progress is being made in the development of any county or state there you will find our "GENUINE OPEN HEARTH IRON" culverts doing their duty in silence and

JUST ANOTHER NEWPORT CULVERT DOING SILENT BUT EFFECTIVE WORK

with no need of maintenance or thought being given to them, buried as they are far under the highways and carrying their billions of tons of traffic yearly throughout the South.

It is quite fitting too, we think, that "Old Kentucky," so long famed for other products, should have added to her list of famous products our "GENUINE OPEN HEARTH IRON" culverts. With the plant making the sheets of which our culvert pipe is made, located in the South, drawing most of their raw materials from the South, this is truly a southern product, and one that we know has played a remarkable part in the South's Development.

NEWPORT CULVERT COMPANY

NEWPORT KENTUCKY

WITHDRAWN FROM
RILEY-HICKINGBOTHAM LIBRARY

What a Rusty Fence Wire Started

AN Iowa farmer started it all when he asked the United States Department of Agriculture why his fence wire was rusting so rapidly.

That was almost twenty years ago.

The Department put the question up to one of its scientists. After long and painstaking investigation he wrote his report: *"The Corrosion of Fence Wire, Farmer's Bulletin No. 239."*

He pointed out the reason why modern steel, manufactured by rapid process and in huge quantities, rusted rapidly, that impurities, especially manganese, in the steel caused much of the trouble.

That pamphlet fell into the hands of a group of men who were just beginning to manufacture steel sheets. They had a small mill in Middletown, Ohio. Their equipment was meager; their money scarce.

Together they discussed the pamphlet—talked over the difficulties of removing the impurities, carefully considered doing things that other manufacturers held were impossible.

Should they try? Should they stake all on an undertaking that was held to be foolish? In a word, should they boldly strike out to do what others held couldn't be done?

It was then the President said "Go ahead!"

For months and months the little 25-ton open hearth furnace where experiments were made gripped the interests of that group of men, while other men throughout the country shook their heads and said: "They're crazy—it can't be done."

Time after time hope intermingled with despair. But always when the days seemed darkest, there was the encouragement of the one who first said, "Go ahead!"

Finally the rift in the clouds opened wide, the sunshine of success broke through, the way was found. The world was given the purest *iron* ever produced in commercial quantities—ARMCO Ingot Iron.

And today that little mill of former days is the parent of the world's largest manufacturer of special analysis sheet metal—a gigantic organization reaching all parts of the world.

Beside the battery of huge 100-ton furnaces, the old 25-ton furnace is to hundreds of men in the organization a cherished memory, but to a certain few it is a monument to the men who still maintain with the old-time steadfastness that "Nothing is impossible."

ARMCO Ingot Iron is used for:

Building construction, railroad construction, underground installations, stoves, furnaces, refrigerators, washing machines, enameled ware—in fact, wherever a durable sheet metal is preferred.

ARMCO Ingot Iron

Write for Booklet, "What Causes Rust"

The American Rolling Mill Co.

MIDDLETOWN, OHIO

(EXPORT) THE ARMCO INTERNATIONAL CORPORATION

MIDDLETOWN, OHIO CABLE ADDRESS—ARMCO

CLOSE-UP VIEW OF THE "PIONEER" FURNACES AT BIRMINGHAM, ALABAMA

South of the Mason-Dixon Line Manufacturers Depend Upon

"PIONEER" PIG IRON

DUE to our strategic location at Birmingham we are in an ideal position to serve Southern manufacturers. Pioneer Iron has constructively followed the South's development for more than fifty years

At our various Northern mills we manufacture

SHEETS, BARS, PLATES, PIPE, BOLTS
NUTS, TURNBUCKLES, SPIKES, Etc.

Republic Iron & Steel Company

General Offices: REPUBLIC BUILDING, YOUNGSTOWN, OHIO

SALES OFFICES

BIRMINGHAM BUFFALO PHILADELPHIA CINCINNATI ST. LOUIS PITTSBURGH CLEVELAND
CHICAGO BOSTON DETROIT NEW YORK DALLAS SAN FRANCISCO

Youngstown Pipe *in* *Progressive Southern Hotels*

No better barometer of progress and development in any section of the country can be found than its hotels. They are usually erected to meet the demands of business already in existence, and their character indicates unfailingly the business conditions and business spirit prevailing in their locality.

The hotels shown here are only a few of those erected in The South during the past two years in which modern fire-proof construction, the highest type of hotel architecture, and the most advanced ideas of arrangement and furnishing are exemplified.

YOUNGSTOWN PIPE

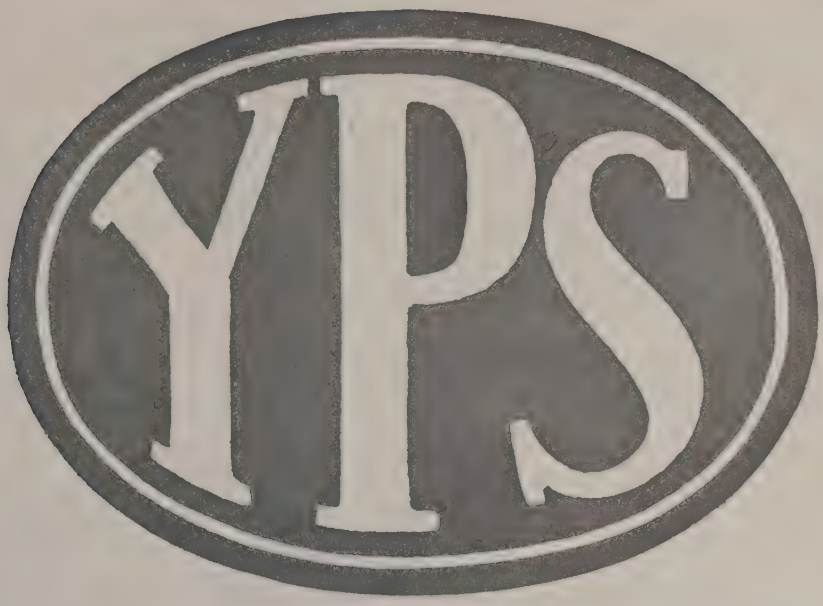
has been used exclusively in all of these fine hotels, as well as in many others in all parts of the South. No better evidence of the wide recognition accorded to the Quality of "Youngstown" products could be found, for the men who planned and built these structures are among the most progressive in their sections.

The YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN OHIO

District Sales Offices:

Atlanta	Healey	Bldg.
New Orleans	Audubon	Bldg.
St. Louis	Post Dispatch	Bldg.
Cincinnati	Union Trust	Bldg.
Boston	Massachusetts Trust	Bldg.
New York	Hudson Terminal	Bldg.
Philadelphia	Franklin Trust	Bldg.
Pittsburgh	Oliver	Bldg.
Cleveland	Union Trust	Bldg.
Detroit	First Natl. Bank	Bldg.
Chicago	Conway	Bldg.
Denver	First Natl. Bank	Bldg.
Dallas	Magnolia	Bldg.
San Francisco	Sharon	Bldg.
Seattle	Central	Bldg.
Kansas City, Mo.	Commerce	Bldg.
Minneapolis	Andrus	Bldg.



Builders, from coast to coast, have come to expect certain things of every metal fireproofing product which bears the YPS mark—and it's a matter of pride with this company that they shall never be disappointed.

Mahoning Metal Lath—*A base for guaranteed plaster work.* The distinctive Mahoning Diamond Mesh easily takes the minimum of mortar required to produce a perfect plaster surface.

Ideal Rib Lath—Rigid in both directions, easily handled, erected with nested lap or one diamond lap with no hump to bother plasterer. Keys the plaster perfectly.

Youngstown Corner Bead—*The most Rigid Wing Bead on the market.* It automatically provides a true guide line for finished plaster and a straight, *permanent* corner, at real saving in erection cost.

Sharon Base Bead—Provides a clearly defined guide line for workmen and prevents staining of wall plaster by cement base.

Youngstown Box Channel—Will not turn over nor buckle—as light as ordinary 16-gauge channel and at least 25% more rigid. The first choice of the best builders for furring channel.

Youngstown Pencil Channel—A miniature Youngstown Box Channel. Easier to handle than pencil rod, will not turn over during erection and is ordinarily less expensive then pencil rods.

YPS Steel Basement Windows—Notable for their trim, sturdy construction—"the stiffest frame on the market"—with positive lock, special hinges, quick-glazing provision—unusually easy to install.

Detailed literature describing these and other YPS Products will gladly be mailed to you.

THE YOUNGSTOWN PRESSED STEEL COMPANY

Warren, Ohio

LUKENS STEEL

ORIGINALLY established in 1790 by Isaac Pennock, the great-grandfather of the present management. In 1810 the present site was selected. In the changes and rapid development which have since taken place in the IRON AND STEEL INDUSTRY, the aim of the management has been to anticipate the requirements of the trade at all times. It is significant that the management over all of these years has remained in the hands of the direct descendants of the originator of the business, and it is not uncommon to find members of the third generation now working in its mills.

THE LUKENS MILLS WERE

THE FIRST TO MAKE BOILER PLATES IN AMERICA

and today they have the distinction of operating

THE WORLD'S LARGEST PLATE MILL

furnishing the largest flanged heads and widest plates in the world.

Use our rust resisting copper bearing steel. Get in touch with us for pressed steel parts of any description.

AMONG THE OTHER PRODUCTS OF OUR MILLS ARE

Flanged and Dished Heads, Manholes, Etc.

LUKENS STEEL COMPANY

COATESVILLE, PENNSYLVANIA

The "Lukens Steel" New Orleans Warehouse Insures Better Service to All Users of Steel

In building this new up-to-date warehouse with complete fabricating plant, the dominating thought was to insure the utmost facilities and services to all consumers of steel. Modern facilities, large stocks, strategic geographic location enables us to guarantee immediate and continuous service through water, rail or truck shipments to all customers.

FULL STOCKS AT ALL TIMES:

Plates, Structural Sheets, Rivets, Bar Iron and Bar Steel, Bolts, Boiler Tubes, Shafting Stay Bolt Iron, Tool Steel, Key Steel, Flanged and Dished Heads, Boiler Flanges, Patch Bolts, Manholes

LUKENS STEEL COMPANY

NEW ORLEANS, LA.

Representing

LUKENS STEEL COMPANY, Coatesville, Pa.

WORLD'S LARGEST PLATE MILL

for continued development and improvement

"A.W."

TRAFFIC TREADS

DIAMOND PATTERN ROLLED STEEL

Successful on one of the country's most heavily-traveled bridges, and successful everywhere

ALBANY AVENUE BRIDGE—ATLANTIC CITY, N. J.

COUNTY OF ATLANTIC
DEPARTMENT OF ENGINEERING
GUARANTEE TRUST BUILDING
ATLANTIC CITY, N. J.

ALEXANDER H. NELSON, COUNTY ENGINEER
FREDERICK S. STEELMAN, ASST. COUNTY ENGINEER
CHAS. T. TRIMBLE, SECRETARY

SUBJECT

Sept. 30th, 1924

Alan Wood Iron & Steel Co.
Widener Bldg.
Philadelphia, Pa.

Gentlemen: Attention Mr. I.M. Smith

In reference to the "AW" traffic treads, installed on the two easterly spans of the Albany Avenue Bridge, spanning Inside Thorofare on the Pleasantville Boulevard in Atlantic City, I am pleased to advise that the construction is not only entirely satisfactory to the Board of Chosen Freeholders but the traveling public has expressed its unqualified approval of the improvement. The fact that the County is now in the market for additional similar construction over the other two spans of the bridge is the best evidence of the disposition of the Board of Chosen Freeholders in the situation.

The plates show no wear and, regardless of the fact that as many as six thousand automobiles have frequently crossed the bridge in one day during the summer that has just passed, we have had no maintenance on the traffic treads and getting rid of the disturbing noise resulting from heavy trucks traveling on the floor plank is easily worth the cost of installing the plates, which takes no account of the very greatly increased life of the plank floor by reason of the covering plates.

Yours truly,

Alexander H. Nelson
County Engineer.

THE "A. W." TRAFFIC TREAD

"A.W." Quality Products

"SWEDE" PIG IRON
BILLETS—BLOOMS—SLABS
SHEARED STEEL PLATES
BLUE ANNEALED SHEETS
ROLLED STEEL FLOOR PLATES

Write us for additional data

Alan Wood Iron & Steel Co.

Widener Building, PHILADELPHIA, PA.

NEW YORK BOSTON DALLAS SAN FRANCISCO LOS ANGELES SEATTLE

The Goal of Yesterday is the

Offices:

ATLANTA CINCINNATI CHICAGO CLEVELAND
DALLAS DENVER DETROIT HOUSTON
LOS ANGELES NEW YORK CITY PHILADELPHIA
PITTSBURGH ROCHESTER ST. LOUIS
SAN ANTONIO SAN FRANCISCO

Stocks:

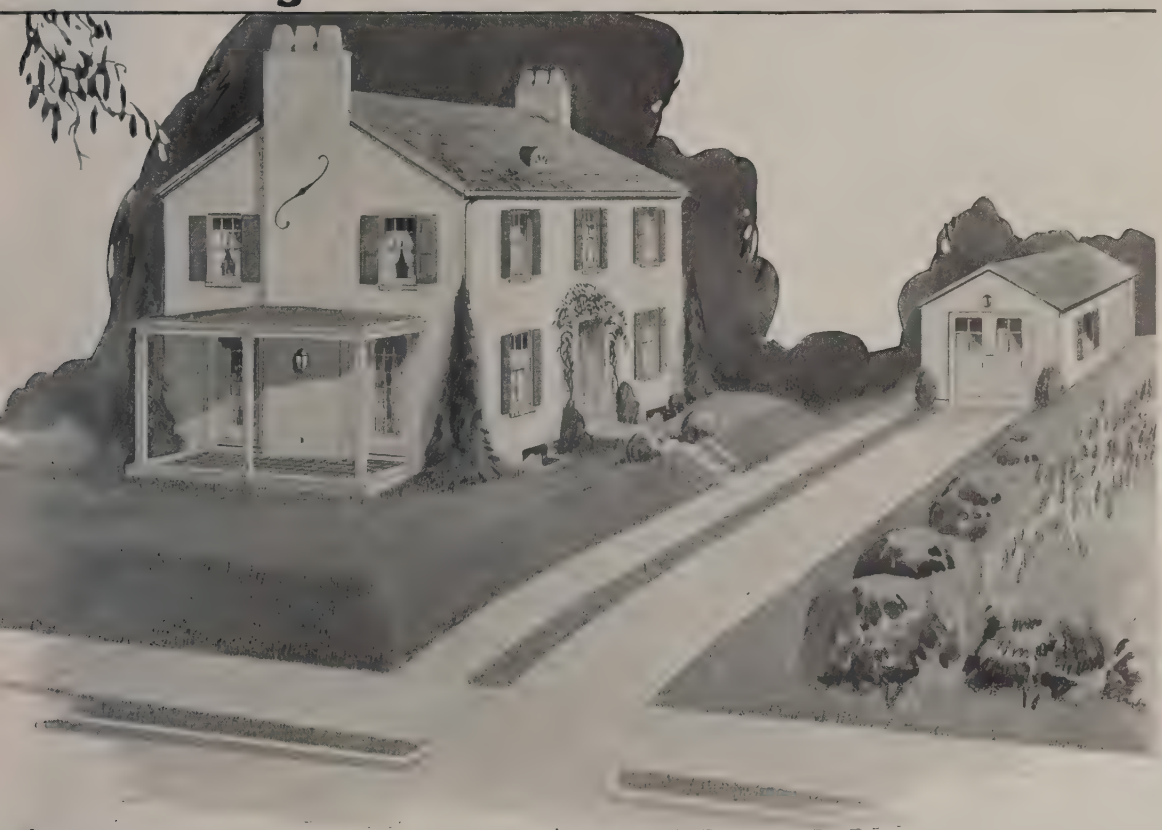
CHICAGO HOUSTON LOS ANGELES NEW YORK
PITTSBURGH SAN FRANCISCO

NATION

Subsidiary of P

UNION TRUST BUILDING

Starting Point of Tomorrow



Even as "the recognition of the structural capabilities of concrete reinforced with steel opened up a new era in engineering design."
—(Engineering News-Record, 1/5/22).

So also did the advent of National Steel Fabric make possible the application of the principles and advantages and economies of reinforcement, to even the humblest cottage.

From the 2″x 2″ square mesh of 14-gauge galvanized wires with attached waterproof paper backing, universally used as a combined base and reinforcement for stucco, plaster, and gypsum in all types of construction—

Through the various styles of square and rectangular fabric used for reinforcing sidewalks, driveways, and floors, such as the two million square feet in the huge General Motors Building at Detroit—

Up to the heavy mat fabric which has been developed especially to resist the stresses that develop in concrete roads and streets—

For these, and for every purpose where a plastic material such as concrete, gunite, gypsum, plaster, stucco, etc., is used, National Steel Fabric is the most economical and the recognized reinforcement, and is being used on an ever increasing number of jobs.

Before you build with concrete, stucco, plaster, and other plastic materials, get in touch with our nearest office—they can probably help you reduce your estimates and construction costs.

National Steel Fabric Company

(SUBSIDIARY OF PITTSBURGH STEEL CO.)

702 Union Trust Building, Pittsburgh, Pa.

Offices:

ATLANTA CINCINNATI CHICAGO CLEVELAND
DALLAS DENVER DETROIT HOUSTON
LOS ANGELES NEW YORK CITY PHILADELPHIA
PITTSBURGH ROCHESTER ST. LOUIS
SAN ANTONIO SAN FRANCISCO

Stocks:

CHICAGO HOUSTON LOS ANGELES NEW YORK
PITTSBURGH SAN FRANCISCO

From The Largest Steel Mills In The South

THROUGH THE MOST UP-TO-DATE HAVEMEYER BAR WAREHOUSES AT BIRMINGHAM AND OTHER DISTRIBUTING CENTERS—

TO THE JOB OF WHATEVER TYPE AND WHEREVER LOCATED—

HAVEMEYER BARS AND BUILDING PRODUCTS

BACKED BY HAVEMEYER SERVICE

HAVE BEEN AN IMPORTANT CONTRIBUTING FACTOR IN

THE SOUTH'S DEVELOPMENT

HAVEMEYER PRODUCTS

A Complete line of Metal Building Products

Havemeyer Bars for reinforced concrete—Bent or straight Havemeyer Supporting, Spacing and Tying Devices for holding bars in place in forms.

Inserts	Base Bead	Soffit Clips
Channels	Metal Lath	Security Anchor
Curb Bars	Corner Bead	Expanded Metal
Wire Mesh	Stair Tread	Crimped Furring
Spirals	Bar-Tys	Bar Spacers

Catalogs on request

Concrete Steel Company

NEW YORK

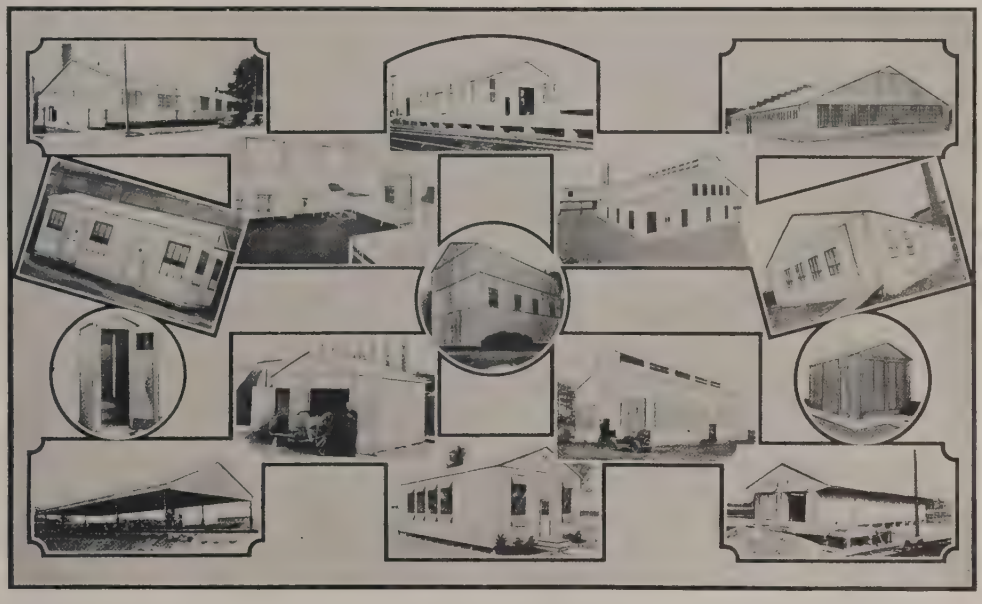
Southern Office:
BROWN-MARX BUILDING
Birmingham, Ala.

OTHER OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

For The Modern Industrial Organization

VARIETY OF CONSTRUCTION TYPES IN

MARYLAND METAL BUILDINGS



THESE photographs represent buildings of varied types, constructed to render most satisfactory service for the owner's particular purpose. Built exclusively of *Lyonore Metal*, with patented, interlocking, weather tight joints, these buildings are a permanent addition to your plant, yet can be moved with a 95% salvage.

We carry separate units in stock, which can be assembled, in multiples of 2′, to any size, suitable for your requirements. A permanent building at a reasonable price.

Maryland Metal Buildings can be adapted to every industrial purpose

Send For Catalog SD

MARYLAND METAL BUILDING COMPANY

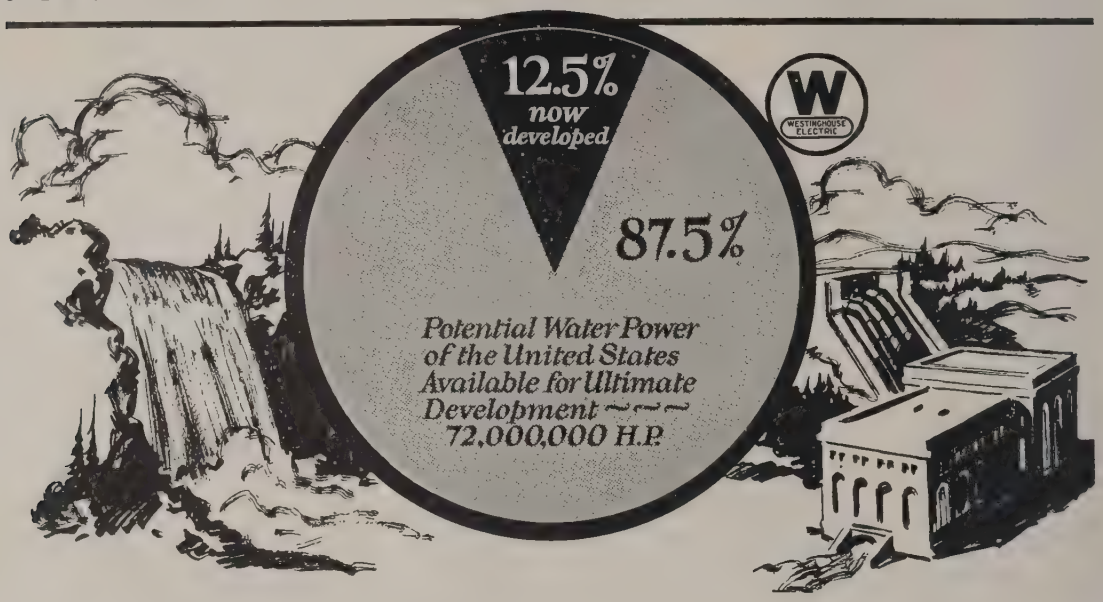
MANUFACTURERS

PHILADELPHIA
416 Crozer Building

Main Office and Factory:
BALTIMORE

NEW YORK
160 Broadway

ECONOMIC TRENDS IN THE ELECTRICAL INDUSTRY



The Future for Hydro-Electric Power

Generation of hydro-electric power in this country has developed more in the past six years than in thirty-five years preceding. Estimates are that it will double by 1930, and then redouble in seven years more.

And yet, of over 50,000,000 horsepower available, only 9,000,000 are now being utilized. By 1937 — even if the foregoing estimates are exceeded — there will still be millions of horsepower unused.

Such is the future for only one field of the electrical industry. And it covers many fields: (to name a few) railway electrification, water transport, industrial heating, power transmission, materials handling, radio, household appliances, farm power—home, street, and industrial lighting.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
EAST PITTSBURGH, PA.

Westinghouse

Westinghouse developed the alternating current principle which made possible the cheap and efficient transmission of power over long distances. Westinghouse produced and developed the turbine generator. Westinghouse produced the first apparatus to harness Niagara Falls.

FAIRBANKS, MORSE & CO. takes pleasure in participating in this Fifty Year Review Volume of the South's Progress, a record of accomplishment in which the company has been privileged, year by year, to play its part.

¶ *TO AGRICULTURE,* the company has contributed much of the equipment of progress, notably, the farm engine, pumping equipment for all capacities and uses, the home lighting plant, the windmill, the feed grinder. The cotton gins of the South have been economically powered with Type "Y" Two-cycle Oil Engines. The rice industry enjoys lower cost production through Fairbanks-Morse Oil Engine Pumping Units.

¶ *TO MUNICIPAL ECONOMY,* Fairbanks-Morse Oil Engine Electric Lighting, Power, and Pumping Plants have contributed much in reliable service at lower costs.

¶ *TO ALL INDUSTRY,* "Fairbanks-Morse" is the symbol of low cost power in self-contained dependable generating and application units. The early perfection of the Type "Y" Two-cycle Oil Engine afforded reliable oil engine power in a simple, rugged unit, far in advance of general oil engine development. Thousands of horsepower quickly went into wide service.

Fairbanks-Morse Electrical Equipment has served the South in many fields. The development of the Fairbanks-Morse Ball Bearing Motor has set another great industrial precedent in providing motor equipment for longer service, at low attendance cost, and greater efficiency.

"Fairbanks Scales" has been the recognized emblem of reliability in every field of commodity handling for more than ninety years.

¶ The company has constantly widened its own facilities for service to the South. It has five great factories, and ten southern sales and service branches, strategically located for quick response to southern needs. It is equipped to go forward, dedicated to the purpose of economically meeting southern equipment requirements with its broad line of products, each mechanically the best that modern manufacture and practice can provide.

FAIRBANKS, MORSE & CO.

Executive Offices: CHICAGO

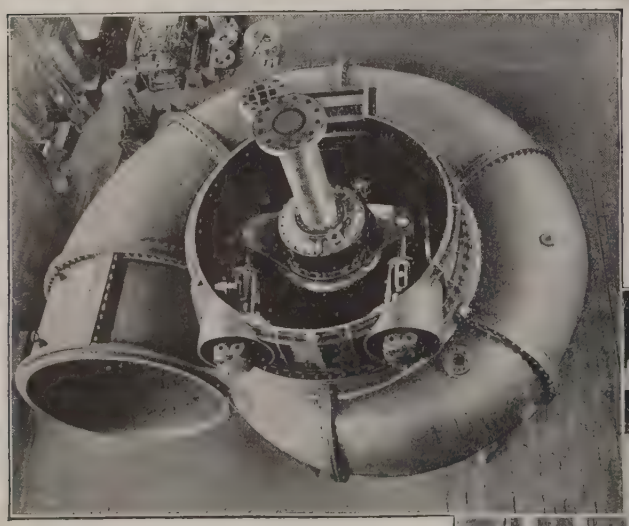
SOUTHERN BRANCHES

Atlanta, Ga.	Charlotte, N. C.	Dallas, Tex.	Louisville, Ky.	St. Louis, Mo.
Baltimore, Md.	Cincinnati, O.	New Orleans, La.	Jacksonville, Fla.	Stuttgart, Ark.

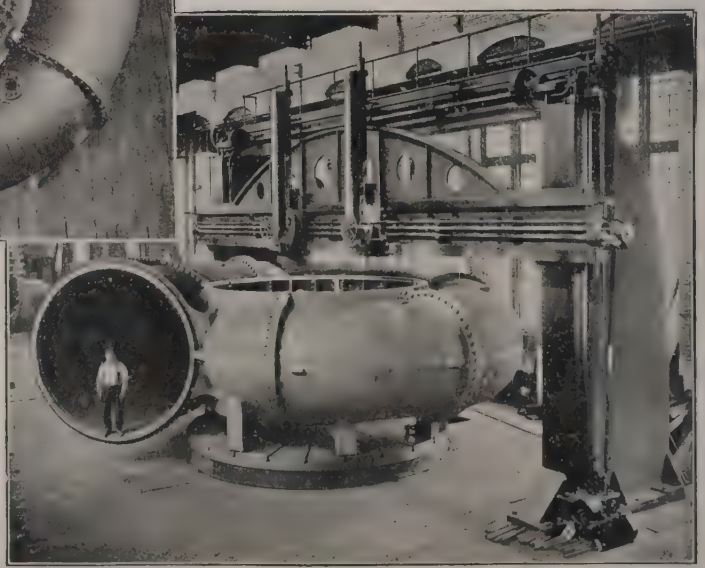
THROUGH YEARS OF Specialization

Smith Hydraulic Turbines and Accessories have become recognized as the highest grade water-power equipment that expert mechanics with modern tools can produce.

Such notable installations as Southern Power Company, at Mountain Island, N. C., and Great Falls, S. C.; Georgia Railway & Power Co., at Tallulah Falls, Tugalo and Sawtooth Dams; and the Aluminum Company of America, at Badin, N. C., in the South, along with the Montana Power Company's Volta and Holter Plants, the Roosevelt Dam in Arizona, and the new Skagit River Plant of the city of Seattle, Wash., mark the successful progress of the S. Morgan Smith Co. in the Hydraulic Turbine Industry.



Pictured above is one of the seven 22,000 horse-power turbines built for Southern Power Company. Below is shown one of four 20,000 horse-power cast-iron scroll case units recently installed at Tugalo Dam of Georgia Railway & Power Co.; also one of these monster spiral cases being machined on our 35-ft. boring and turning mill.



Many interesting developments are illustrated and described in our Bulletin "M," sent on request

S. MORGAN SMITH CO.

YORK, PA.

Branch Offices: BOSTON: 176 Federal Street
CHICAGO: 76 W. Monroe St.
MONTREAL: 405 Power Bldg.
ATLANTA: Red Rock Bldg.

ALUMINUM COMPANY OF AMERICA

PITTSBURGH, PENNSYLVANIA

Producers of Aluminum

Ingot
Sheet
Rod, Bar and Wire
Electrical Conductors
Tubing and Fittings

Castings: Sand, Permanent Mould and Die
Casting Alloys: Strong; Resistant to Corrosion

Aluminum Bronze Powder
Foil
Mouldings
File Guides

Machine Screw Products
Forgings

Sheet Circles
Collapsible Tubes
Bottle Seals
Lithograph Plates

Magnesium
Ingot
Sheet
Powder
Castings

SALES OFFICES:

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BOSTON, MASS.
BUFFALO, N. Y.
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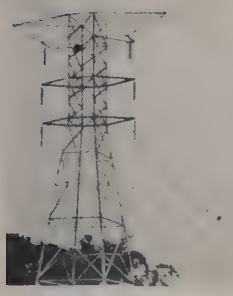
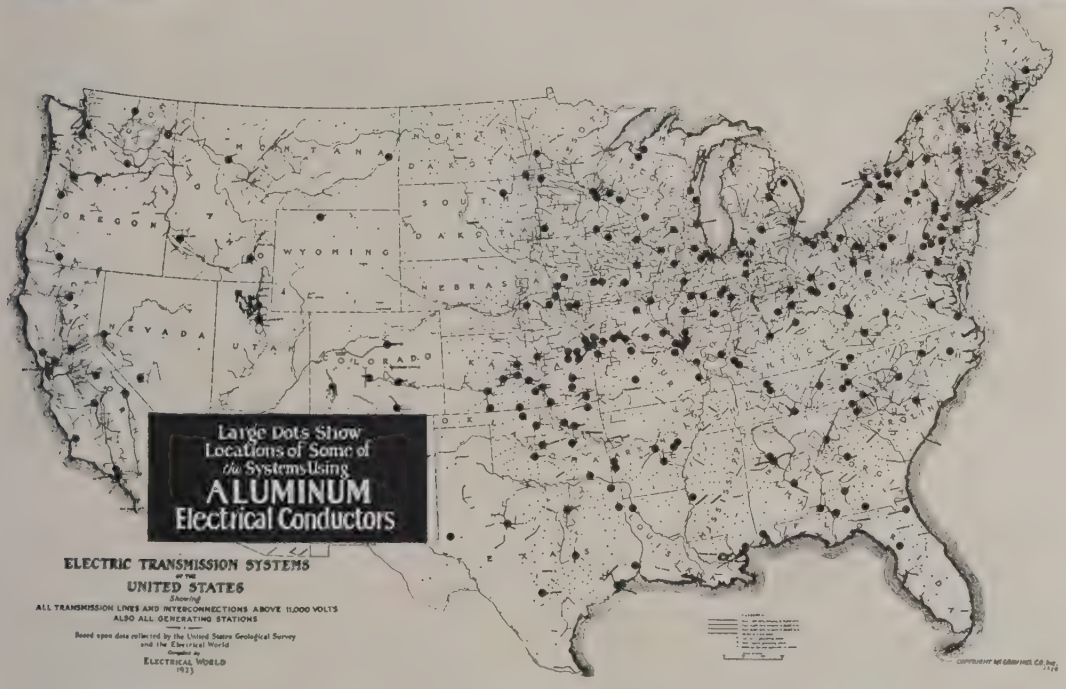
DAYTON, OHIO
DETROIT, MICH.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
MINNEAPOLIS, MINN.
NEW HAVEN, CONN.
NEWARK, N. J.
NEW YORK, N. Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
WASHINGTON, D. C.

ALUMINUM
CONDUCTORS
Typical
Installations



A. C. S. R.

ALUMINUM CABLE STEEL REINFORCED



A Few Prominent Public Utility Companies of the United States Who Are Using A. C. S. R.

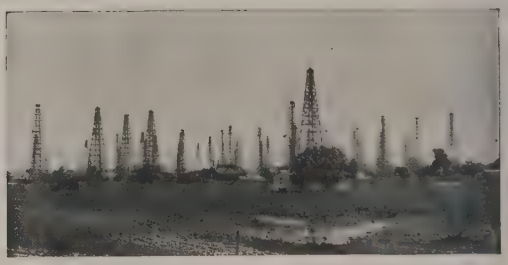
American Gas & Electric Co.	New York
Alabama Power Company	Alabama
Arkansas Power & Light Co.	Arkansas
Abilene Gas & Electric Co.	Texas
Carolina Power & Light Co.	North Carolina
Central Illinois Pub. Serv. Co.	Illinois
Central Maine Power Company	Maine
Chesapeake & Ohio Railroad	
Consumers Power Company	Michigan
Continental Gas & Electric Co.	Nebraska
Dayton Power & Light Co.	Ohio
Denver Gas & Electric Co.	Colorado
Duquesne Light Company	Pennsylvania
Electric Bond & Share Co.	New York
Florida Power Company	Florida
Georgia Railway & Power Co.	Georgia
Great Lakes Power Company	Michigan
Great Western Power Company	California
Hartford Electric Light Co.	Connecticut
Idaho Power Company	Idaho
Illinois Power & Light Co.	Illinois
Interstate Power Company	West Virginia
Interstate Public Service Co.	Indiana
Iowa Railway & Light Co.	Iowa
Kansas City Power & Light Co.	Missouri, Kansas
Kansas Gas & Electric Co.	Kansas
Kentucky Utilities Company	Kentucky
Metropolitan Edison Company	Pennsylvania
Milwaukee Elec. Ry. & Lt. Co.	Wisconsin
Middle West Utilities Co.	Chicago
Missouri Pacific Railway	
Missouri Utilities Company	Missouri
New Jersey Power & Light Co.	New Jersey
N. Y., Phila. & Norfolk R. R.	
Niagara, Lockport & Ontario Power Co.	New York
Northern States Power Co.	Minnesota
Northwestern Electric Co.	Oregon
Northern Pacific R. R.	
Ohio Power Company	Ohio
Ohio Public Service Co.	Ohio
Otter Tail Power Company	Minnesota
Pacific Gas & Electric Co.	California
Potomac Transmission Co.	Maryland
Philadelphia & Reading R. R.	
Pittsburgh & Lake Erie R. R.	
Rochester Gas & Electric Corp.	New York
San Joaquin Light & Power Co.	California
Southern California Edison Co.	California
Southern Sierras Power Co.	California
Southern Railway	
City of San Francisco	California
City of Seattle	Washington
City of Tacoma	Washington
Tennessee Electric Power Co.	Tennessee
Texas Power & Light Co.	Texas
Union Gas & Electric Co.	Ohio
U. S. Reclamation Service	Wyoming
Virginia Western Power Co.	Virginia
Wisconsin River Power Co.	Wisconsin
Washington Water Power Co.	Washington

HERCULES (Red Strand) WIRE ROPE

REG. U. S. PAT. OFF.

An Important Factor in the South's Development

Logging in Mississippi. The first steam skidder used in the South was equipped with Hercules (Red-Strand) Wire Rope.



A Texas oil field. The first successful wire line for drilling oil wells was a Leschen Wire Rope.

Confederate Memorial, Stone Mountain, Ga.

A Leschen Aerial Tramway in Kentucky, carrying coal from mine to railroad.

Construction work on Georgetown Bridge across the Potomac River near Washington, D. C.

The Burden Bearer

THE South, in the development of its many resources, has been a large user of Wire Rope.

In its great industries and on its large enterprises, Hercules (Red-Strand) Wire Rope has taken an important part as burden bearer.

"Hercules" has logged its timber; mined its coal and other minerals; constructed its highways and railroads; built its dams, power plants and bridges; erected its state houses and its industrial buildings; and it has served in practically every other phase of the development and growth of this great section of our country.

The long service record of Hercules (Red-Strand) Wire Rope has fully demonstrated that it performs its work safely and economically; as the result of its service record, its labors have constantly grown greater and greater, not only in the South, but throughout the Nation and the World.

Made only by

A. LESCHEN & SONS ROPE COMPANY

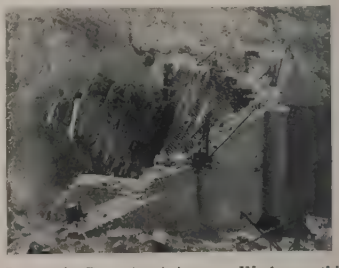
5909 Kennerly Ave. ST. LOUIS Established in 1857

New York Denver Chicago San Francisco

The accompanying illustrations show a few of the South's many well-known projects or industries, on which Leschen Wire Rope has been the chief burden bearer.

Iron furnaces in Virginia.

The Missouri State Capitol at Jefferson City. Just recently dedicated.



Roosevelt Dam in Arizona. Work on this project began in 1904.

LESCHEN WIRE ROPE

PATHFINDERS

THE development of the wire and wire rope industry during the past eighty years has been phenominal. It may indeed be called one of the most interesting romances of the mechanical world.

The history of wire dates back many centuries, but the industry as we know it is comparatively modern. Starting in a crude way about 1840, and with few uses, we find to-day that wire and wire rope are essential assets to our modern civilization. In the production of oil; the mining of coal and metals; quarrying; dredging; in large construction and engineering projects; in the transportation of heavy timbers; in telephone and telegraph communication and even in our latest method of communication by wireless, wire and wire rope render an essential service to all industry and thus to mankind. It would be difficult to visualize the effect which the elimination of wire and wire rope from the catalogue of the world's useful things would have upon the destinies of mankind.

The part that the John A. Roebling's Sons Company has had in the tremendous development of this industry is indicated by the several large factory groups surrounding the original site in Trenton, New Jersey, and still another group situated ten miles south of the city in the town of Roebling, New Jersey. This amazing growth emphasizes the fact that Roebling products have year by year successfully met the exacting demands of industry.

John A. Roebling's Sons Company

TRENTON, NEW JERSEY

NEW YORK BOSTON CHICAGO PHILADELPHIA PITTSBURGH CLEVELAND ATLANTA
SAN FRANCISCO LOS ANGELES SEATTLE PORTLAND, ORE.

Some Contributions toward Southern Industrial Progress

THE history of American industries contains no more interesting chapters than those relating to the progress of the South during past few decades, in the development of its natural resources and in the extension and diversification of its many industries.

The magnitude of many of these developments, which have been the marvel of the nation, bespeak the vision, courage and confidence of Southern leaders in their country and its industries. The rapid growth of these industries shows also the extent to which these leaders have employed modern equipment, for only with modern machinery could so much have been accomplished in a comparatively short period.

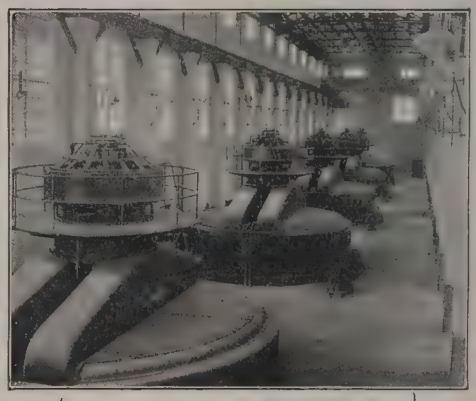
In many of these developments and industries Allis-Chalmers equipment is being extensively employed and has had an important part in their extension.

A very considerable portion of Southern Hydro-Electric power is supplied by Allis-Chalmers machinery in plants of Southern Power Co., Alabama Power Co., Tennessee Electric Power Co., Parr Shoals Power Co., and many others.

Allis-Chalmers equipped Textile Mills, Saw Mills, Flour Mills, Water Works, Sewage Plants, Cement Making Plants will be found throughout the South. Allis-Chalmers equipment has been an important factor in the building of its great dams, public works, sewage plants, drainage projects, etc., and has contributed to the success of many Southern industries, such as sugar crushing and refining, steel making, mining and others.

Allis-Chalmers Engineers, through its Southern offices, serve its customers in many lines of Power, Electrical and Industrial Machinery.

HYDRO-ELECTRIC STATION

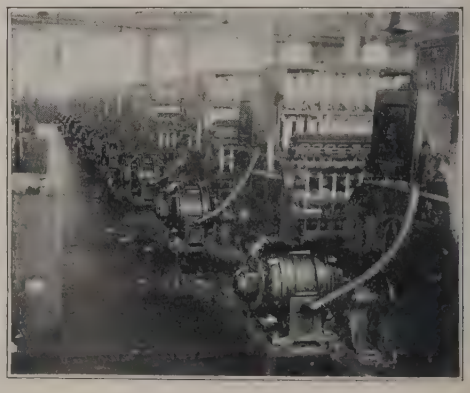


Southern Industries and Developments

in which

ALLIS-CHALMERS EQUIPMENT IS EXTENSIVELY USED

WATER POWER DEVELOPMENT
COTTON MILLS
LUMBER
REFRIGERATING PLANTS
DRAINAGE PROJECTS
IRRIGATION PROJECTS
PULP AND PAPER PLANTS
PHOSPHATE FIELDS
OIL PIPE LINE PUMPING
SUGAR FACTORIES AND REFINERIES
MINES
FURNITURE FACTORIES
FLOUR MILLS
GRAIN ELEVATORS
CEMENT MAKING PLANTS
STEEL MILLS
CONSTRUCTION—DAMS, ETC.
MUNICIPAL WATER SUPPLY
CENTRAL STATIONS
INDUSTRIAL POWER PLANTS



TEXTILE MILL

ALLIS-CHALMERS SOUTHERN OFFICES:

ATLANTA
BALTIMORE
BIRMINGHAM
CHARLOTTE
DALLAS
KANSAS CITY
NEW ORLEANS
ST. LOUIS

ALLIS-CHALMERS MANUFACTURING CO.

MILWAUKEE, WIS. U.S.A.

PROGRESS

POWER TRANSMITTING MACHINERY

SHAFTING	COUPLINGS
PULLEYS	SET COLLARS
HANGERS	ROPE DRIVES

FRICTION CLUTCHES

BY INVITATION MEMBER

NEW YORK, U.S.A.

HAVING been a privileged participant in the progress and development of the South, we wish through this Jubilee Number of the Manufacturers Record to extend cordial greetings and congratulations to our many Southern friends and to express our appreciation of the confidence in our products and policy, which we feel has resulted from our business relations during this period. We hope to merit a continuance of this confidence by maintaining the same standards of business which we established nearly three-quarters of a century ago.

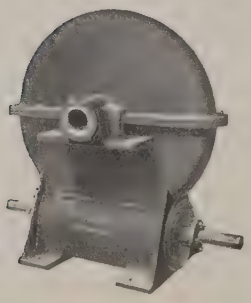
T. B. WOOD'S SONS CO.

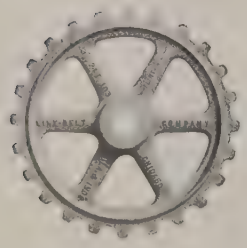
Manufacturers of Power Transmitting Machinery exclusively and continuously since eighteen fifty-seven

CHAMBERSBURG, PENNSYLVANIA

Southern Office: GREENVILLE, SOUTH CAROLINA
New England Office: CAMBRIDGE, MASSACHUSETTS

—Caldwell—and the Service Factor





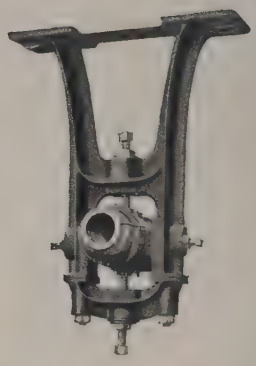
IT HAS been a point of pride with the Caldwell organization to measure plant efficiency by the number of orders shipped on the day received.

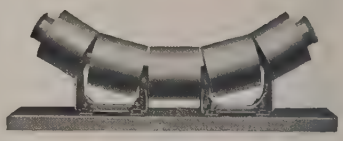
Caldwell keeps half-a-million dollars' worth of equipment in stock at all times. Through many years of experience we have learned which equipment is most commonly ordered, and we utilize this experience in the maintaining of our stock.

No matter what your needs may be in the elevating, conveying and power transmission field, there is a Caldwell product adaptable for your use.

Test our service ability.

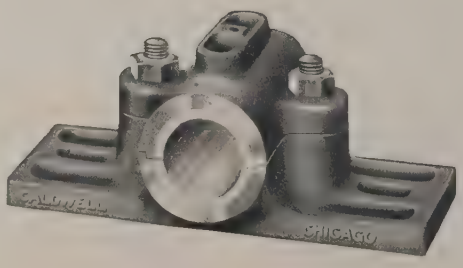
Write or wire Caldwell, or the nearest Link-Belt office.





Caldwell Line

Power Transmission Machinery.
Bearings.
Shafting.
Pulleys.
Machine Molded Gears.
Cut Gears.
Rope Drives.
Chains, Wheels, Buckets



Caldwell Line

Elevating and Conveying Machinery.
Helicoid Conveyor and Accessories.
Belt Conveyors.
Chain Conveyors.
Elevator Buckets.
Boots and Casings.
Catalogs on request.

H. W. CALDWELL & SON CO.

C-28A

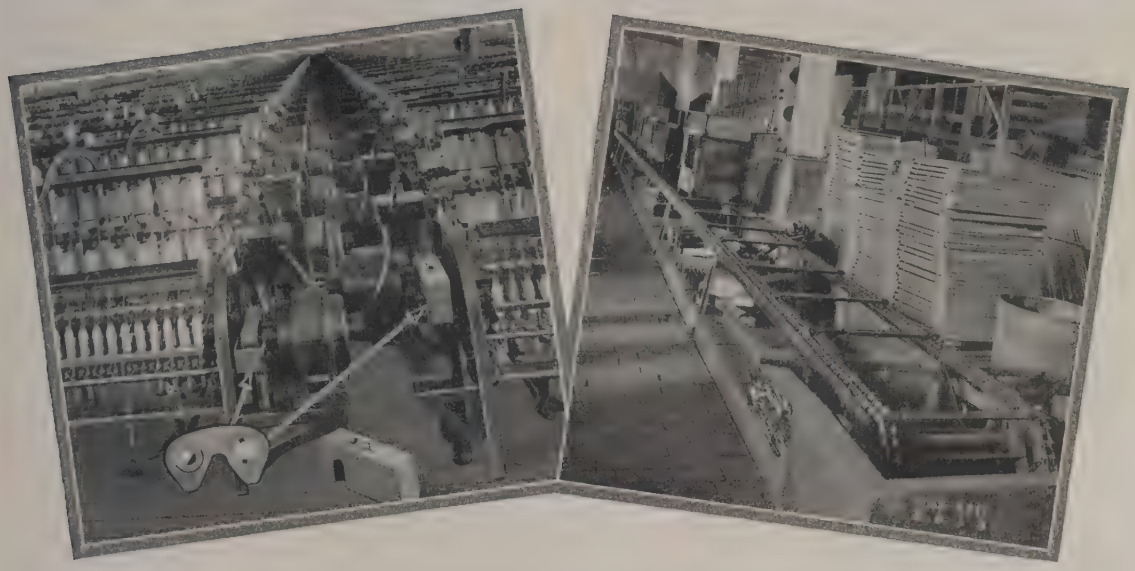
LINK-BELT COMPANY, OWNER

NEW YORK: 2676 Woolworth Bldg.
CHICAGO: 1700 S. Western Ave.
DALLAS, TEXAS: 810 Main St.

Link-Belt Company Offices in Principal Cities

CALDWELL

Link-Belt Equipment Serves the South



SAVING time, labor and power—producing with greater efficiency, at lower costs, and in larger volume than would otherwise be possible—these are some of the important results being accomplished with Link-Belt machinery throughout the industries of the South.

For the transmission of power from prime mover to machines, Link-Belt Silent Chain, and other types of Link-Belt chain drives, are widely used. For handling raw and finished materials of every kind, Link-Belt conveyors, elevators, cranes, electric hoists, and practically every other type of mechanical handling equipment, are effectively employed.

To find out how you can produce more economically with Link-Belt elevating, conveying and power transmission equipment, address nearest Link-Belt office.

Other Link-Belt Products

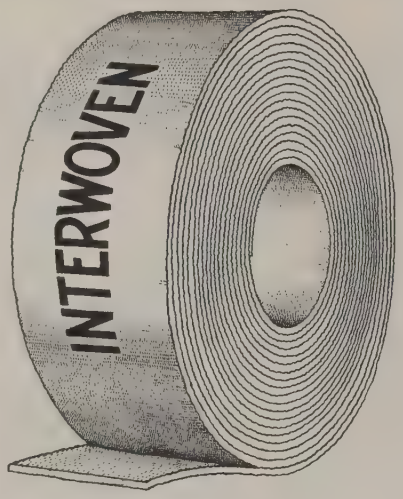
Elevators and Conveyors for all materials.
Locomotive and Crawler Type Cranes.
Coal and Ashes Handling Equipment.
Sand and Gravel Washing Plants.
Loading and Unloading Machinery.
Coal Tipples.
Belt Conveyors.
Handling Equipment for the Sugar Industry.
Chains for every Service in Conveying and Power Transmission.
Send for catalogs.

LINK-BELT COMPANY 2000

Leading manufacturers of Elevating, Conveying and Power Transmission Machinery

PHILADELHIA, 2045 Hunting Park Ave. CHICAGO, 300 W. Pershing Road INDIANAPOLIS, P. O. Box 346
Louisville, Ky., 321 Starks Bldg. Atlanta, 24 Marietta St. Dallas, Texas, 810 Main St. Birmingham, Ala., 720 Brown-Marx Bldg.
Ashland, Ky., V. P. Dalmas & Co., 100 Winchester Ave New Orleans, 504 Carondelet Bldg., Whitney Supply Co., Ltd., 733 Tchoupitoulas St.

LINK-BELT



"Interwoven" Solid Woven Belt

Suitable for general power transmission. Highly resistant to chemicals and acids. Flexibility combined with great strength. No plies to come apart. Steam and water-proof. Low initial cost and low operating cost. The most efficient medium for power transmission on the market.

MANUFACTURED BY

THE CHESAPEAKE BELTING COMPANY

813-823 HOMEWOOD AVENUE, BALTIMORE, MD.

Also Manufacturers of "CHESAPEAKE STITCHED CANVAS BELTING"

Save Time, Save the Truck Save Money

Giant Grip Traction Chains make the truck master of all roads in all weather. A stalled truck strains the motor, strains the chassis, often results in costly damage. Giant Grips go on in a jiffy without tools or jack. Styles and sizes for wood or steel spoke wheels, single or dual tires. Won fame in the World War.

Write for particulars today.

Giant Grip Manufacturing Co.
Dept. 11 OSHKOSH, WIS.

Giant Grip

CAPITAL LIFTS

VERTICAL LIFTING DEVICES
FOR EVERY PURPOSE

Electric Power
Elevators,
Dumbwaiters,
Newspaper Lifts,
Form Lifts,
Stereotype Plate Lifts,
Roll Paper Lifts,
Abattoir Lifts,
Ash Lifts,
Sidewalk Lifts,
Automobile Lifts,
Ice Lifts,
Fuel Lifts,
Mailbag Lifts,
Mine Lifts,
Loose Material Lifts,
Warehouse Elevators,
Book Lifts,
Trunk Lifts,
Ice Lifting Machines.

Hydraulic Power
Sidewalk Lifts,
Roll Paper Lifts,
Counterbalanced Freight Lifts,
Ash Lifts.

Hand Power
Elevators,
Dumbwaiters,
Sidewalk Lifts,
Trunk Lifts,
Form Lifts,
Check Lifts,
Ash Lifts.

Automatic Gravity
Ice Droppers,
Stereotype Plate Droppers,
Roll Paper Droppers,
Milk Can Droppers,
Boxed Goods Droppers.

Stereotype Plate Trucks, Roll Paper Trucks,
Elevator Guide Lubricators, Warehouse Trucks,
Electric Worm Gear Drives for Conveyor Manufacturers.

Our Engineering Department is at the disposal of architects, engineers and owners in designing equipment for unusual conditions.

Capital Lift & Manufacturing Co.
COLUMBUS, OHIO

At left, Birmingham plant. 20-ton Shepard Traveling Crane in plate girder shop.

Birmingham plant. 15-ton Shepard Traveling Crane in receiving yard.

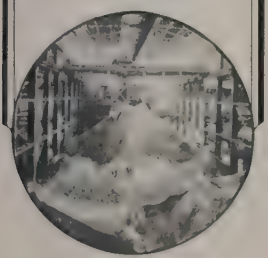
Birmingham

Service rendered

—the vital factor in business development

A few Shepard installations in the South:

Newport News Shipbuilding & Dry Dock Co., Newport News, Va.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Atlantic Ice and Coal Corp., Atlanta, Ga.
New Orleans Public Services, Inc., New Orleans, La.
Lynchburg Foundry Co., Lynchburg, Va.
Northern Texas Traction Company, Fort Worth, Texas
Barber & Ross, Inc., Washington, D. C.
Standard Foundry Company, Anniston, Ala.
Lukens Steel Company, New Orleans, La.
Skinner Machinery Company, Dunedin, Fla.
Jahncke Services, Inc., New Orleans, La.
Southern Ice & Utilities Co., Dallas, Texas
Dixie Portland Cement Co., Richard City, Tenn.
Southern Utilities Corp., Palatka, Fla.
Standard Wholesale Phosphate Co., Baltimore, Md.
Mooresville Cotton Mills, Mooresville, N. C.



Above, Shepard Grab Bucket Crane in Wilson and Toomer fertilizer plant, Jacksonville, Fla.

"Our business has been built on SERVICE, and it is necessary that we select the equipment we use on the same basis," so states Mr. Robert J. Meybin, Vice-President and General Manager of the Virginia Bridge & Iron Co.

That's why 163 Shepard units are installed in the three plants of this sucessful company of the South.

A hoist that operates over 30,000 times a day

Mr. George Rasmussen, Chief Mechanical Engineer, bespeaks Shepard service when he informs us that, "the pit riveter hoist operates over 30,000 times a day, and has for ten years with no repairs aside from slight attention."

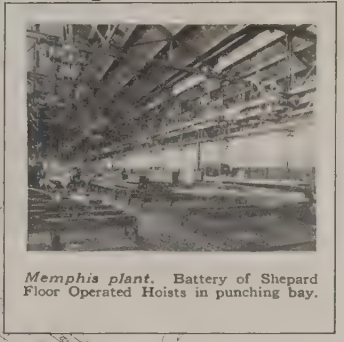
The steady performance of Shepard Electric Cranes and Hoists is a dependable aid to production in the plants of many Southern manufacturers.

Service rendered is the factor that makes the Shepard Electric Crane & Hoist Company the largest manufacturer of electric hoists in America.

Electric Hoists and Cranes in capacities of 500 pounds to 30 tons.

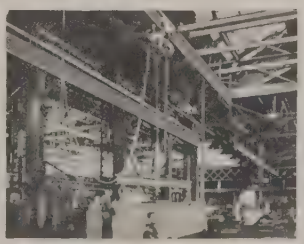
SHEPARD ELECTRIC CRANE & HOIST CO.
362 Schuyler Ave. Montour Falls, N. Y.

Branches in Principal Cities
Member Electric Hoist Manufacturers Association
Southern Office: Lexington Building, Baltimore, Md



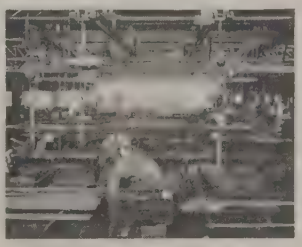
Memphis plant. Battery of Shepard Floor Operated Hoists in punching bay.

Memphis



Roanoke plant. Shepard pit riveter hoist which is operated over 30,000 times a day.

Roanoke



Roanoke plant. Remote control Shepard hoists which travel length of punch shop, arranged on suspended trolley to pass through I-Beam Crane runways.

SHEPARD
ELECTRIC CRANES & HOISTS

Philadelphia Electric Co., Delaware Station, S-A Coal Handling Equipment Recently Augmented.

Designers and Builders of

LABOR SAVING
MATERIAL HANDLING
Machinery For All Industries

Complete Installations of

COAL AND ASH HAND
LING MACHINERY
For Power Plants, Large and Small

S-A Engineers planned and executed the coal handling equipment for this eastern plant.

S-A Conveying Machinery

All kinds of materials, from eggs, soap flakes, coal and ore to bales, barrels and automobiles are being carried on S-A Conveyors.

Designing and building conveyors and elevators is our business. We have specialized in this class of machinery for over twenty years. Our Engineering Department has been developed to the point where it can give you valuable assistance, not only with simple conveyors, but on planning your entire installation. We can help you decrease manual labor and cut your handling costs to the absolute minimum.

Power Plants. You probably get the greatest possible power from each ton of coal—but can't you cut the cost of handling that coal and ash? We have built and improved the coal and ash handling systems for hundreds of power plants, large and small, cutting handling costs many cents per ton. Track hoppers, feeders, crushers, pivoted bucket carriers and elevators, overhead storage bins, gates and weigh larries—all designed by our engineers to handle your coal and ash in the most efficient manner.

Gravel and Crushed Rock. We have designed and built the machinery for many plants, no two alike, to enable the owners to produce the cleanest and most saleable product at the lowest cost. We build every piece of screening and conveying machinery—Gilbert screens, belt conveyors, bucket elevators, settling tanks and feeders.

Ore and Metal Mines. The large tonnage and heavy materials handled in this industry call for massive conveyors and handling machinery. Cast steel feeders, big belt conveyors, heavy steel bucket elevators—we design and build them and they "stand the gaff."

Industrial Plants. Platform conveyors, elevators and conveyors for barrels, boxes and crates, car pullers, portable conveyors and other devices are a part of our service to the industrial field as a whole.

Engineering Service. If your handling costs are running high or you have a material handling problem, write us about it. Our Engineers will be glad to make suggestions and preliminary layouts.

Write for a copy of our Belt Conveyor Catalog 26-R, using your business stationery.

Stephens-Adamson Mfg. Co.

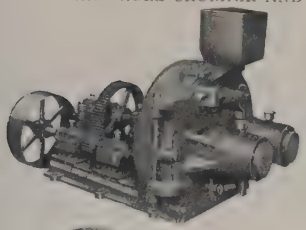
Aurora, Illinois

GRUENDLER

DOUBLE ROLL CRUSHER

Gruendler Double Roll Crushers are manufactured in sizes from 18-inch diameter to 72-inch diameter. Widely used in metal mines, Quarries, Glass Plants, Coal and Asbestos manufacturing. Their ruggedness has reduced mining cost to a minimum. We also manufacture Single Roll Crushers.

RING ROLL CRUSHER AND PULVERIZER

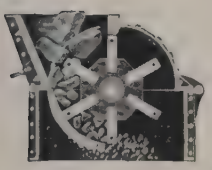


The Gruendler Ring Roll Pulverizer is known for the low upkeep in grinding such materials as phosphate rock, feldspar, and all hard materials, from 50 to 80 mesh and finer, and are manufactured in various sizes. We furnish slow speed air separators or vibrating shaker screens with these installations for sizing product.

JAW CRUSHER

Gruendler Jaw Crushers are manufactured from sizes of 6x6" opening to 60x84" opening, and widely used in quarries, cement plants, preliminary breakers. They are very heavy in construction with all wearing parts adjustable.

MONSTER HAMMER CRUSHER



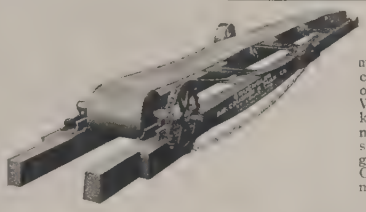
Gruendler Monster Type Crushers will handle 36" rock and reduce to 1½" and finer in one operation for tube mill feed, or adapted for handling quarry run of rock, coal. This type of crushers has replaced as many as three secondary crushers, turns out a uniform product, and will make the greatest reduction of any type crusher on the market. Manufactured entirely of steel in sizes from 3 tons to 6000 tons daily. This type also equipped with heavy rolls, reducing upkeeps to a minimum.

SWING HAMMER FINE PULVERIZER

Gruendler Swing Hammer Pulverizers, are adapted for thousands of crushing, grinding, shredding purposes such as screenings for road surfacing, lime dust for agriculture, by-product coke plants, wood refuse, shale, bones, butcher scrap, beef heads and carcases, slag for recovering metals, reduction of steel turnings for recovering oils and many other purposes. Manufactured in 31 different sizes and types.

MOTOR DRIVEN GRINDERS WITH FAN ATTACHMENT

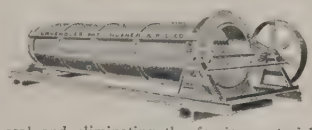
Gruendler Grinders with fan piping and cyclone collectors are widely used in the feed grinding industry, also for grinding such product as shavings into wood flour, beef scrap for poultry feed, oats, shell corn, ear corn, cork, chemicals, foundry facing, diatanacious earth, fuller's earth and many other materials. By the use of air system, they increase capacity and convey materials dustless. We have solved hundreds of crushing problems. Will test your materials upon receiving sample without charge.



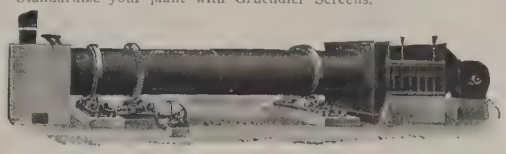
CONVEYORS

Conveying equipment for rock ores, coal, and many other purposes. When in the market for conveying machinery, be sure and investigate the sturdy Gruendler Equipment.

REVOLVING SCREENS



Gruendler Revolving screens are now in great demand in quarries, mines and for many other purposes because of their powerful construction and low upkeep, for scalping, sizing or for breaking coal and eliminating the foreign material. Manufactured in all sizes. We also furnish vibrating shaker screen magnetic pulleys. Standardize your plant with Gruendler Screens.



DRYERS

Gruendler Dryers are manufactured of steam, direct heat or indirect heat type for clays, stone, coal, also special grain and alfalfa dryers. There are many problems of drying required before grinding. You will find Gruendler Dryers the solution to many of these problems.

BUCKET ELEVATORS

Gruendler elevating equipment manufactured to suit each particular job, all steel enclosed, continuous and open quarry type with chain or belt in any capacity desired. Also manufacture portable power loaders saving from one to five men. Investigate our equipment.

GRUENDLER CENTRIFUGAL ROLL PULVERIZERS WITH AIR SEPARATION

Gruendler Pulverizers with air separation are now popular amongst such industries, as pulverizing China clay for the manufacturing of paints, powdered coal for burning, shale and rock dust for mines, for prevention of explosions and many other fine grinding problems, ranging from 50 mesh to 300 mesh. Their durable construction reduces upkeep to a minimum.

GRUENDLER PATENT CRUSHER & PULVERIZER COMPANY

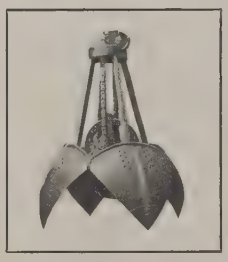
960 North First Street — ENGINEERS — ST. LOUIS, MO.

Standard Products Manufactured: Jaw Crushers, Coal Crushers, Swing Hammer Crushers, Pulverizers, Single Roll Crushers, Double Roll Crushers, Fine Grinders, Revolving Screens, Shaker Screens, Portable Loaders, Conveyors, Elevators and complete Mining Machinery for Mine or Quarries.

Gruendler Engineers, having practical experience in every phase of crushing and pulverizing for over thirty-five years, will be glad to give you the benefit of their service. Gruendler products have been standardized for years, giving maximum service at minimum cost. Correspondence is a pleasure.

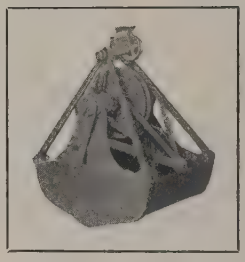
Hayward Buckets

TRADE HAYCO MARK



Hayward and Buckets

These two words have been coupled together since automatic buckets were first used for digging and rebuilding work—and that was many years ago



SOME of the old firms will remember the fight against labor-saving devices—everything that could be was handled by man and beast. As the years rolled by, labor became too expensive and scarce, opening up a wider field for machinery—and it was during these pioneer days that Hayward Buckets were introduced.

At first we not only built buckets, but, in addition, entire machines, such as dredges, excavators, bridges, towers—in fact, practically every type of machine used to operate Hayward Buckets.

We discontinued all special machines except the exclusively designed Hayward Skid Excavators and Dredges, and concentrated on the buckets and these machines.

The thought of our entire organization is centered on building better buckets. There is hardly a month passes but what some improvement is made in some size or type of Hayward Bucket that means more efficiency and less upkeep cost to the user. Hayward blazed the trail and many followed, but we are the only concern today whose entire Engineering and Sales Staff is devoted to designing, building and selling buckets that will give the user the most economical results—everything considered.

Hayward has been identified with all the important development work of the South—and Hayward Buckets are marching forward today with the progressive growth of the South.

The advice of our Engineers on all material-handling problems has been and is yours, without cost, for the asking. We sincerely trust you will take advantage of this service and that we will become better acquainted with you and your problems.

The Hayward Company

50-52 CHURCH STREET

NEW YORK U. S. A.

Typical of the South's Great Progress

stands the North Carolina Power and Light Company's new Cape Fear station at Moncure, North Carolina. Modern in every respect it was but natural that this company should choose Brownhoist coal handling equipment throughout.

The equipment shown above is an electrically operated locomotive crane and bridge. This provides large storage capacity and feeds the coal to a movable crusher, traveling over the concrete bunker in the power house.

Brownhoist builds many types of machinery for the large or small power plant. We will gladly, and without obligation, work with your engineers in the designing or modernizing of your power plant.

Brownhoist Products

Locomotive Cranes
Creeper Cranes
Belt Conveyors
Chain Conveyors
Concrete Bins
Crushers
Buckets
Larries

Literature on request

The Brown Hoisting Machinery Co., *Cleveland, Ohio*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans, London, Eng.

BROWNHOIST

MATERIAL HANDLING EQUIPMENT

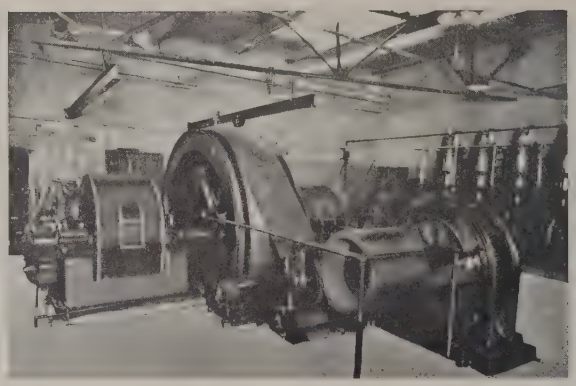
25% MORE POWER *from* THE SAME GAS ENGINE

Saved 31 Feet Floor Space
Saved 62 Feet of Belting

THIS increase in the capacity of a 300 h.p. gas engine driven alternator is one of three highly important benefits derived by a Western power company from the installation of a Lenix drive. That company needed space for an additional unit.

The Lenix reduced the floor space of 41 feet of the original layout to 10 feet. The space reduction of 31 feet enabled them to place the new unit in the same engine room.

The cost of the addition to the building was saved. The new belt is approximately 62 feet shorter than the original belt and this *saving in belting was more than sufficient to pay for the Lenix.*



300 H.P. gas engine driven alternator.
Engine pulley 114" diameter, 31" face.
Alternator pulley 27" diameter, 27" face.
Pulley centers 10 feet.

FIVE POINTS:

1—The Lenix increases the arc of contact between belt and pulley.
2—The Lenix maintains constantly and accurately the proper tension in the slack side of the belt.
3—The Lenix saves floor space, building space and belting because of freedom in pulley locations.
4—The Lenix saves in bearing friction, lubrication and renewal of bearings because of reduced bearing pressure.
5—The Lenix permits the use of less expensive, high speed and high efficiency motors or generators because of the higher pulley ratios.

In the words of the general manager of the power company:

"We were able to shorten our belt centers approximately 31 feet; this has meant a great saving to us in room and permitted room for an additional unit. The drive has also been very helpful by eliminating belt slippage and belt trouble generally and increasing the capacity of the unit about 25 per cent. It has also increased the life of our belt and we are highly pleased with the operation of this drive from that standpoint as well as the saving of space."

The Lenix is not an idler. It is a 'belt wrapper' scientifically applied to belt drives for the purpose of saving slippage and space, eliminating belt slippage and increasing the capacity of the drive.

"More than five thousand Lenixes are now in successful operation on drives ranging from 1 to 1400 horsepower.

Send for Booklet

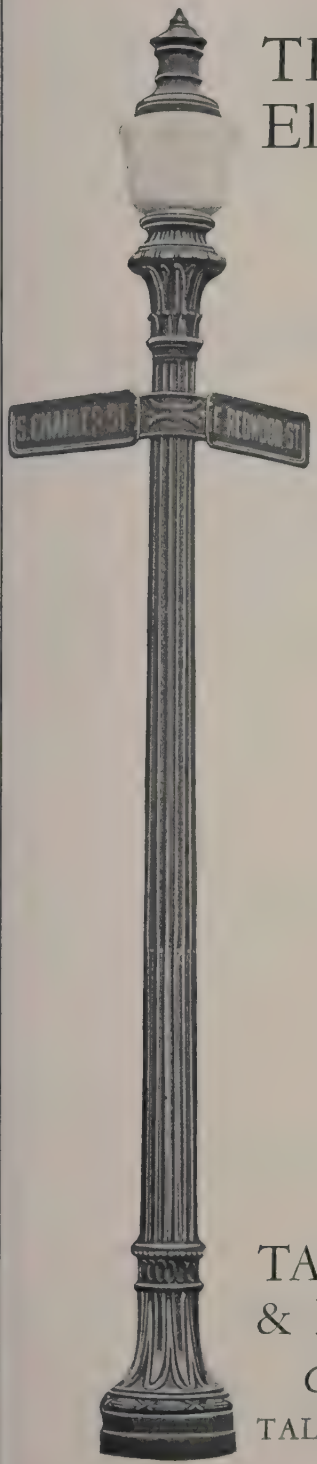
SAVING SLIPPAGE and SPACE

F. L. SMIDTH & CO., *Engineers*

50 CHURCH STREET, NEW YORK, N. Y.

THE LENIX BELT DRIVE

(REGISTERED)

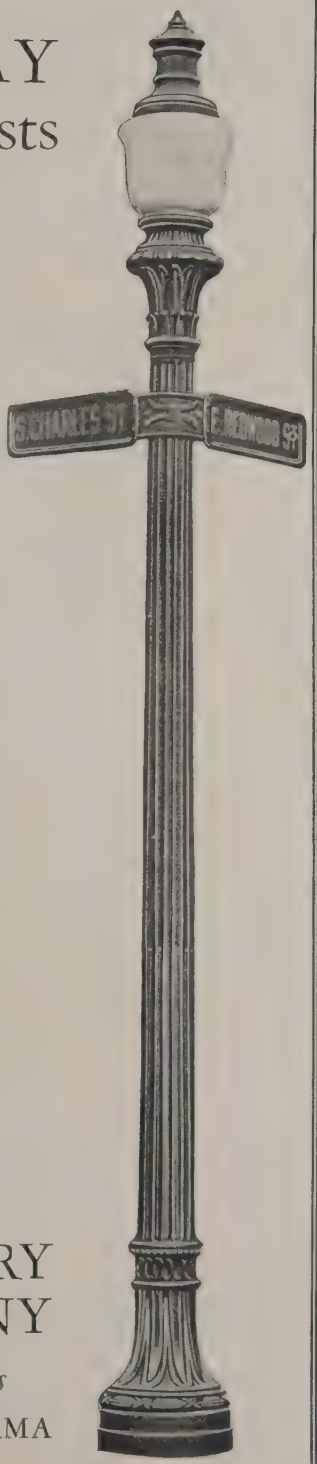


THE WHITE WAY
Electric and Gas Posts

have been installed in the City of Baltimore to such complete satisfaction as to justify a reorder

These "White Way" posts also grace the streets, both business and residential, of our Nation's Capital, and have found their way into Columbus, Ohio, and many other cities, large and small.

Such orders have forced us to enlarge our plant and it is now incorporated to the extent of a quarter million dollars. Now we are ready to install the "White Way" system in your community.



TALLADEGA FOUNDRY & MACHINE COMPANY

General Founders and Machinists

TALLADEGA ALABAMA

Brick–Hollow Building Tile

TO picture the splendors of autumn in its glorious luxuriance of colors, its lavish richness, its mellow softness, is to describe the natural artistic beauties of the imperishable, harmoniously blended tones of

Johnson City Face Brick

In their wide variety of pleasing textures and colors is to be found a combination of mingling, or an individual shade, appropriately adapted to every style of architecture and every type of home or building.

At our plant, which operates the largest continuous kiln in the United States, with every modern facility at hand and an unlimited abundance of the highest quality shale, the ceramic art, as applied to brick and hollow tile manufacture, has been brought into a high state of practical scientific perfection.

The same high quality typical of our face brick is likewise predominant in our common building brick and hollow tile, which are outstanding for their tremendous strength and low absorption qualities, and our enormous production assures prompt deliveries, regardless of requirements.

We have an excellent sales agreement for reputable, wide-awake dealers in territory not already allotted.

INQUIRIES SOLICITED

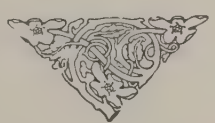
Johnson City Shale Brick Corp.

JOHNSON CITY, TENNESSEE

"The South's Greatest Face Brick Plant"

Kingsport Artistic FACING BRICK

OTHER building materials have merit and appeal, but no other material approaches face brick in the structural strength and artistic value it offers — everlasting, insurance against fire and storm, economy and beauty. ¶ Use face brick, the secret of economical building. ¶ Kingsport Mingled Shades excel in beauty and blend of colors. ¶ Kingsport Reds possess that softness of color so appealing to the owner. ¶ Write for prices and copy of Architectural Color Patterns in Kingsport Brick.



Daily Capacity 135,000 Brick

Fifteen Years in Business

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KINGSPORT
TENNESSEE

Brick Homes are Best—

Best for comfort—for architectural charm—for age-endurance—for year round freedom from heat, frost and moisture—for all that makes and keeps home—HOME.

Homes built of Duro Brick have a resale value almost at par after long years of shelter and service.

DURO is not only the name of our brick, but it's the symbol of a high type of helpful service for home builders.

Ask to see Our Famous Pure Alluvial Clay Products.

Mercer-Duro
America's handsomest face brick; eight beautiful shades.

Ratine-Duro
Attractive rough surface face brick.

Cravenette-Duro
Superfine quality smooth face brick.

Cherokee Red Duro
A rich red face brick of great charm.

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A common brick of quite uncommon quality.

Durotile
The strongest, most durable and most economical building block obtainable. All sizes and shapes.

Wesleyan Brick
Rough texture in range of colors. Medium price face brick of good value. Economical to lay.

WE MAKE SPECIAL MOULDING AND ARCH BRICK ON ORDERS

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VISIT OUR SHOWROOMS AT 460 BROADWAY

KONSET
REG. U.S. PAT. OFFICE
PATENT APPLIED FOR

KONSET IS THE ONLY CEMENT ACCELERATOR, HARDENER AND WATERPROOFING MADE IN THE SOUTH.

IT IS A LASTING BENEFIT TO CONTRACTORS, ENGINEERS AND OWNERS.

We also manufacture Cement Surface Hardeners, Permanent Paste Mortar Colors, Technical Preservative Paints and Compounds.

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Ford Motor Co., Memphis, Tenn.
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Peabody Hotel, Memphis, Tenn.
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Monongahela Bank Bldg., Morgantown, W. Va.
Ashland National Bank Bldg., Ashland, Ky.
Rialto Theatre, Louisville, Ky.
Central Savings Bank Bldg., Monroe, La.
Robert E. Lee Hotel, Winston-Salem, N. C.
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Estimates and Suggestions Furnished on Request

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CLEVELAND MEMPHIS LOUISVILLE

View showing size of Base and Operator with "BERG" Surfacer.

BERG

Concrete Surfacer and Finisher

OPERATING ON THE

Highest Concrete Monument in the World

A Shaft Rising to a Height of 351 Feet to the Memory of

JEFFERSON DAVIS

President of the Southern Confederacy

To Mark the Place of His Birth At Fairview, Kentucky

Contributed by the Daughters of the Confederacy

Contractor Gregg, after using various devices as concrete surface finishers, finally heard of the "BERG" equipment.

The "BERG" is a portable, electrically operated machine, attached to any electric light socket.

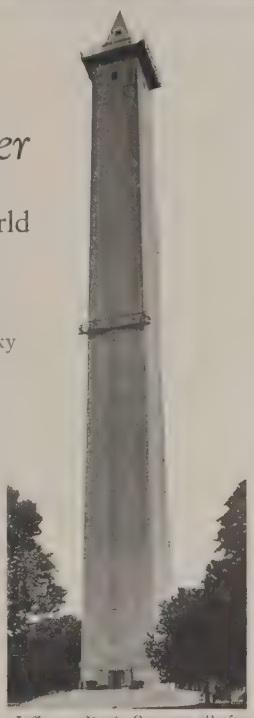
Its use during the past nine years by contractors of buildings, bridges, stadiums, power units, concrete block and products plants, etc., has proven the "BERG" a time, labor and money-saving device which should be a part of the equipment of all those in the Concrete Industry.

THE CONCRETE SURFACING MACHINERY COMPANY

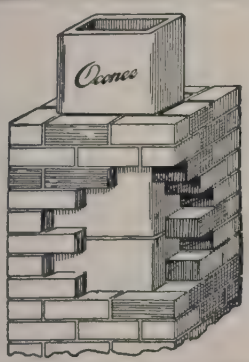
4669 SPRING GROVE AVENUE

CINCINNATI OHIO, U. S. A.

ADDRESS: DEPT. M.



Jefferson Davis Concrete Shaft. Two "BERG" Surfacers at work.



Manufacturers *of* CLAY PRODUCTS

To fit your requirements, whether they be for building tile, wall tile, floor tile, fire clay, flue pipe, fire brick, furnace-door linings, drain tile, etc., etc

Oconee's Products have been used by contractors far and wide, and it is to you that we invite the patronage.

OCONEE BRICK & TILE CO.—*Milledgeville, Ga.*

QUALITY — QUANTITY — SERVICE

THE Company is prepared to meet all demands upon it promptly. We have plants equipped to give volume production and the facilities to handle that production promptly and economically. Our plants are so distributed that we are prepared to serve the eight Southeastern States. The product, Interlocking Tile, hollow building tile, face brick and building brick, is of the highest quality, and this is backed by a service, careful, personal, attentive—that is a delight to the building public. Your inquiries solicited.

310 Bona Allen Bldg. DENISON INTERLOCKING TILE CO. ATLANTA, GA.

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ADDITION TO NEW YORK STOCK EXCHANGE, NEW YORK

Trowbridge & Livingston
Architects

BUILT OF

GEORGIA MARBLE

The original building was completed in 1903, and the 23-story annex in 1922, both being of Georgia Marble. The financial and commercial world waits eagerly for the news that comes from within these marble walls on every business day.

THE GEORGIA MARBLE CO.

TATE, GA.

The South's Development

Means the enrichment of the nation.

It means changing the raw materials into finished products, giving employment to mankind during the process.

It means the development of communities, the enlarging of towns and the building of cities; it means the broadening of all activities that make urban life possible.

It means an increasing resourcefulness in merchandising and in displaying the goods offered for sale.

The Zouri Store Fronts

have contributed in no little way to merchandising and its problems.

The use of ZOURI products has revolutionized the old-fashioned methods; and there has come into vogue a method which provides clear, unobstructed vision of the articles displayed. With it there has come an assurance of safety to the merchant because of less breakage of his show windows than he has ever experienced heretofore.

Nature has provided the raw materials; man has converted them into finished products for the comfort and convenience of mankind in general. The ZOURI DRAWN METALS COMPANY has made a specific contribution to the comfort and convenience of mankind by introducing improved methods of retailing merchandise, thereby promoting materially

The South's Development

Zouri Drawn Metals Co.
Chicago Heights, Ill.

for FLAT ROOFS

for PITCHED ROOFS

"Cementile" Roofs

Recognized as a big factor in the Development of the South

Iron and Steel
Woodward Iron Co.
Tennessee Coal, Iron & R. R. Co.
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Public Buildings
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Refiners
Petroleum Refining Co.
Crown Oil Refining Co.
Barnesdale Refining Co.
Sinclair Oil Refining Co.
Gulf Refining Co.
Pan-American Petroleum & Transport Co.

They are used in all industries for which the South is famous. Mull over the industries and the partial list of installations at the sides of this column. Perhaps your company is included. If so, you know why you roofed with "Cementile" and the satisfaction that it is giving. But in case you don't know of "Cementile" and how it has helped in the Development of the South, here is the reason.

Because of the everlasting efficiency of "Cementile" roofs, and the fact that the first cost is the last cost (they require no maintenance), the money usually expended for maintenance has instead been spent in the development of new processes, materials, and in keeping abreast of the times in manufacturing.

Roof with "Cementile"—and you too can use the money, heretofore expended for roof maintenance, in the better development of your business.

"Cementile" is made for either flat or pitched roofs —write us for a catalog.

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Western Union Telegraph Co.
American Dry Dock & Shipbuilding Co.
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Southern Railway Co.
Carolina, Clinchfield & Ohio R. R. Co.
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AMERICAN CEMENT TILE MANUFACTURING COMPANY
830 Oliver Building, PITTSBURGH, PA.

OFFICES: Pittsburgh, New York, Philadelphia, Atlanta, Birmingham
PLANTS: Wampum, Pa. Lincoln, N. J. Birmingham, Ala.

CEMENTILE

The Roof Everlasting

CEMENTILE CEMENTILE

For walls that won't burn

Much of the popularity of Sheetrock among Southern builders and home owners is due to its safety and permanence.

For Sheetrock is made from gypsum rock, not wood, pulp or paper. It cannot burn or transmit fire. It is non-warping and non-shrinking—will last as long as the building stands. Sheetrock is easy to use, too; it saws and nails like lumber.

For making the finest plastered walls good contractors strongly favor another material of proved quality—USG plaster in red top bags.

This improved gypsum plaster makes walls extremely dense and durable because of its purity and great cementing strength. It is easy to apply because of its richness and "slip." Economical also, because of its far-spreading qualities.

Both Sheetrock, the fireproof wallboard, and USG plaster in red top bags are sold by your dealer in lumber or building materials.

UNITED STATES GYPSUM COMPANY

General Offices: 211 W. Monroe Street, Chicago, Ill.

STANDARD OF THE SOUTH

PULVERIZED
MASCOT
LIMESTONE

(Trade Mark Registered.)

Asphalt Filler Dust

Asphaltic Roadway Gravel

(⅝ inch to 10 mesh)

Roofing Gravel

(¼ inch to ½ inch)

Agricultural Limestone

Dependable Service

AMERICAN LIMESTONE CO.

McNUTT BUILDING KNOXVILLE, TENN.

Six-Million-Dollar Atlanta-Biltmore Hotel—12 stories of reinforced Slag Concrete. One of fifty Slag Concrete structures erected in Atlanta in recent years.

$1,250,000 home of Louis Pizitz Dry Goods Co.—One of ten important slag concrete structures featured in Birmingham's two-million-per-month building program for 1924.

Mile-Stones that Mark the Progress of the South—and of

"ENSLEY" & "ALA CITY" BASIC SLAG
CRUSHED & SCREENED

Few products have played so large a part in the South's progress in recent years as our scientifically prepared Ensley Basic Slag and Alabama City Basic Slag.

More than a million tons were used in the six Southeastern states last year in 250 miles of hard-surface highways, concrete bridges, city pavements, concrete buildings, built-up roofs and railroad ballast.

The outstanding "evidences" of the South's growth—the investment of millions in modern fireproof buildings and in hard surface, all weather highways—emphasize the dominance of our Basic Slag both as a building material and road metal.

Georgia, F. A. P. 174—3½ miles Slag Concrete paving on Atlanta to Newnan Highway. More than 40 miles of Slag Concrete roads are now in service in the Southeast.

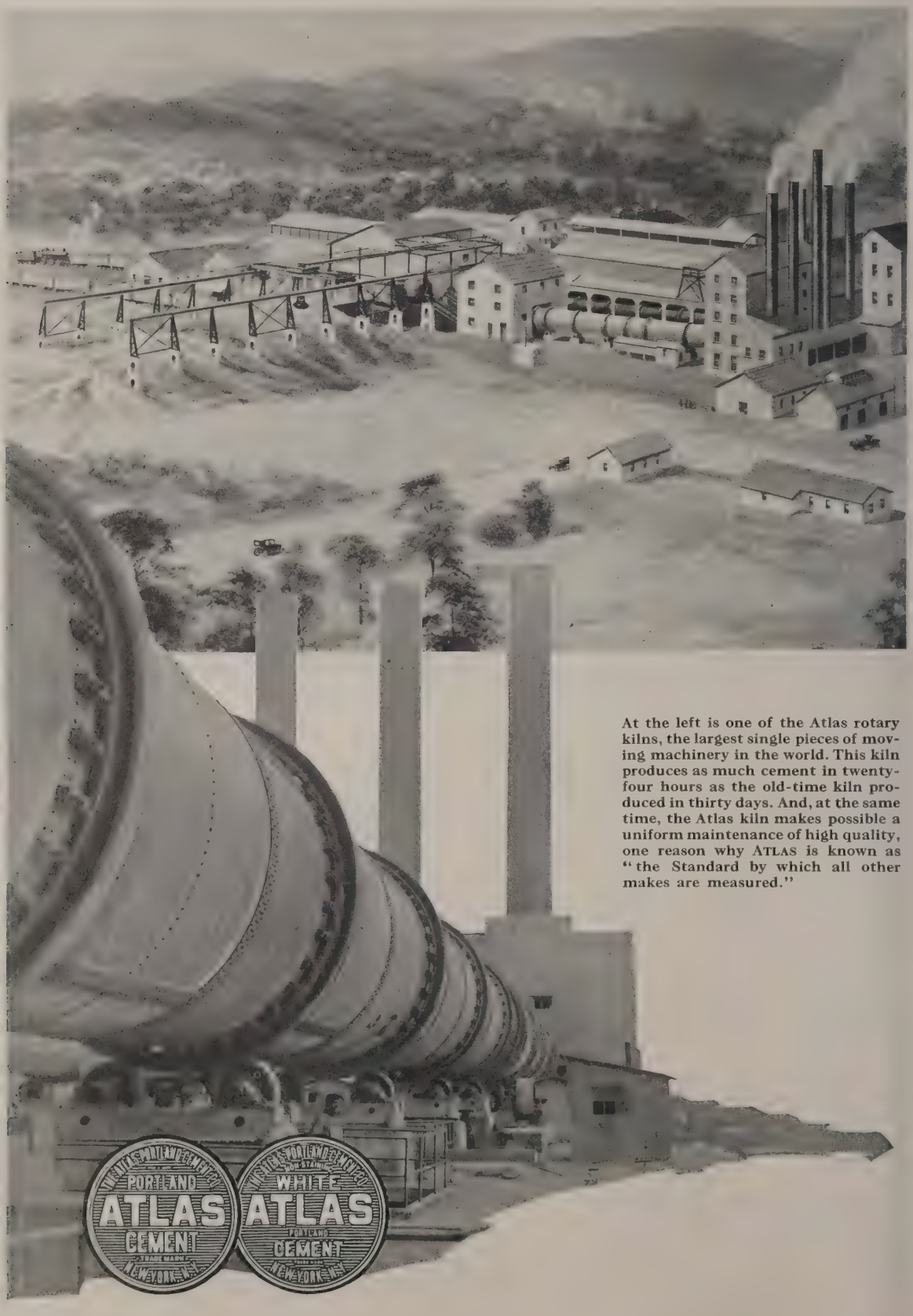
Oconee River Bridge in Pulaski County (Ga. F. A. P. No. 8)—Total length, including paved approaches, 3187 feet; one of the longest, largest bridges ever built in the Southeast; a notable example of slag-concrete bridge construction

East Harris Street, Atlanta—Sheet asphalt on slag binder and slag concrete base. Slag used in Atlanta in over 500,000 square yards concrete and asphalt pavements.

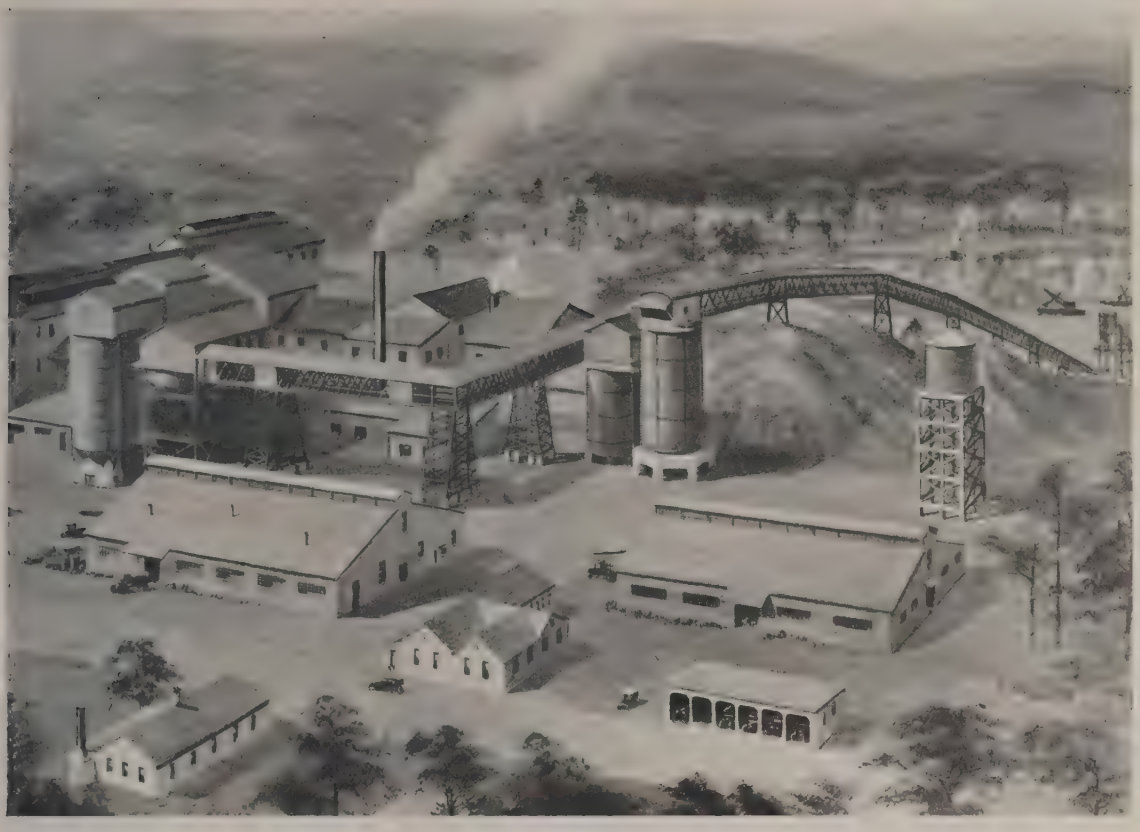
Birmingham Slag Company

Slag Headquarters for the South

ATLANTA BIRMINGHAM THOMASVILLE
ORLANDO MONTGOMERY



At the left is one of the Atlas rotary kilns, the largest single pieces of moving machinery in the world. This kiln produces as much cement in twenty-four hours as the old-time kiln produced in thirty days. And, at the same time, the Atlas kiln makes possible a uniform maintenance of high quality, one reason why ATLAS is known as "the Standard by which all other makes are measured."



Atlas aids in the South's development with PERMANENCE *for all Construction*

CONCRETE made with Atlas Portland Cement is the ideal material for all types of construction. It makes factories permanent, fireproof, safe and sanitary. It sustains the weight of the heaviest machinery and eliminates vibration. And concrete construction is not only economical in first cost but represents a permanent economy through saving in maintenance, repairs and replacements.

This Atlas plant, at Leeds, Ala., supplies manufacturers throughout the South with Atlas Portland Cement in any quantities at any time.

THE ATLAS PORTLAND CEMENT COMPANY

25 Broadway, New York City

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PLANT NO. 1 CLINCHFIELD PORTLAND CEMENT CORPORATION, KINGSPORT, TENNESSEE

To Serve the South's Construction Interests

FOURTEEN years ago our Plant No. 1 began the manufacture of Clinchfield Portland Cement at Kingsport, Tenn. This plant has been in continuous operation ever since and its output has been increased from time to time until it is now producing 1,500,000 barrels of Clinchfield annually.

During this period Clinchfield Portland Cement has continuously gained in favor, not only because of its quality, but also because it has been our constant aim to give complete service to our customers.

Finding our present production unable to meet the demands of Clinchfield, we are now building Plant No. 2 at Coreen, Ga. This will be in operation by March, 1925, and will enable us to serve even more completely our many customers in the Southeast.

We are justly proud of the good name Clinchfield Portland Cement has won among engineers, contractors, public officials and others who have been in charge of construction work in the South. It will be our determination to always maintain the high standard of quality and service upon which our business has been built and prospered.

Clinchfield Portland Cement Corp.

Office and Mills: KINGSPORT, TENNESSEE

Branch Sales Offices:

1305 Union Trust Building
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1511 Healey Building
ATLANTA, GA.

A CONTRIBUTING FACTOR IN THE RAPID AND SUCCESSFUL DEVELOPMENT OF THE GREAT SOUTHWEST

TRINITY PORTLAND CEMENT

Two Mills---capacity two million barrels---wet and dry process. Advanced and efficient manufacturing facilities assure maximum quality and service.

Trinity Portland Cement Company

TWO MILLS

DALLAS FORT WORTH

Concrete for Permanence *The South for Prosperity*

For use in developing the South many hundred thousand barrels of

"COOSA" *and* "PIEDMONT"

Portland Cement

have been used in the South in some of the South's most important construction work

Sales Office: 715 EMPIRE BUILDING, BIRMINGHAM, ALA.

Over One Million Barrels Annual Capacity *Two Mills in the Heart of the South*

CONCRETE *for* PERMANENCE

Service — Quality — Cooperation

Signal Mountain Portland Cement Company

CHATTANOOGA, TENNESSEE

J. I. McCANTS, *Manager of Sales*

SAND and GRAVEL

FOR ALL PURPOSES

Quality-Service

POTTS-MOORE GRAVEL CO.

WACO, TEXAS

CEMENT GUN CONSTRUCTION CO.

THE ORIGINAL
Cement-Gun Work Contractors
Do not confuse us with the man who makes the machine
WE DO THE WORK
Exclusive Contractors and Engineers
Estimates and information cheerfully given.
537 So. Dearborn St. Chicago, Ill. **Pittsburgh Branch Oliver Bldg.**

Southern Concrete Products Co.

CONCRETE PRODUCTS

OF ALL KINDS

Specializing in CULVERT AND SEWER PIPE

ANDERSON, SOUTH CAROLINA

INTEGRITY

IN the purchase of building materials, the sincerity of the products and the integrity of the seller are supremely important.

The Carolina Portland Cement Company markets only the better grades of building materials at fair-play prices, and backs them with a service both prompt and trustworthy.

Purchasers should satisfy themselves as to the integrity of the firms with whom they expect to deal, the sincerity of their products and the character of their service.

CAROLINA PORTLAND CEMENT COMPANY

CHARLESTON, S. C.

Atlanta Jacksonville
Birmingham New Orleans

Lumber, Lime, Cement, Plaster, Roofing
All Building Materials

ROYAL CEMENT

Tested in our laboratory every 60 minutes

QUALITY

DIXIE PORTLAND CEMENT CO. ROYAL CHATTANOOGA, TENN.

SERVICE

1,500,000 Barrels Used Last Year in the Southeastern States

DIXIE PORTLAND CEMENT COMPANY

Chattanooga Tennessee

PORTLAND PHOENIX CEMENT

No Expenditure of Public Money Contributes So Much to the National Wealth As For Building Good Roads.

President Coolidge.

PORTLAND PHOENIX CEMENT

Henry Ford says:

"There is nothing like Concrete for a road; it is unbeatable. I know from my own experience. Properly constructed, a concrete surface will outwear anything else known."

The last 15 years have seen the rapid acceptance of concrete as a wearing surface. In this short period the contracts awarded for concrete in the United States have grown from 34,000 square yards to 296,304,000 square yards. In terms of 18-foot pavement the increase has been from three miles to 28,000 miles. Of these contracts more than 25,500 miles were actually under traffic January 1, 1924, with 2500 miles of unfinished contracts carried over for completion during 1924.

Phoenix Portland Cement Company

Eastern Plant: NAZARETH, PA. *Southern Plant:* BIRMINGHAM, ALA.

Kirkpatrick Lumber & Timber Corporation

YELLOW PINE AND CYPRESS

RED CEDAR SHINGLES OAK FLOORING

MILLS IN
ALABAMA
GEORGIA
MISSISSIPPI

232-3 BROWN-MARX BUILDING
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BIRMINGHAM, ALA.

MEMBER
NATIONAL-AMERICAN WHOLESALE LUMBER ASSOCIATION

TIMBERS—ROUGH & DRESSED—FACTORY FLOORING

DIMENSION FLOORING, CEILING, SIDING, FINISH, LATH, ROOFERS SHIPLAP BOARDS

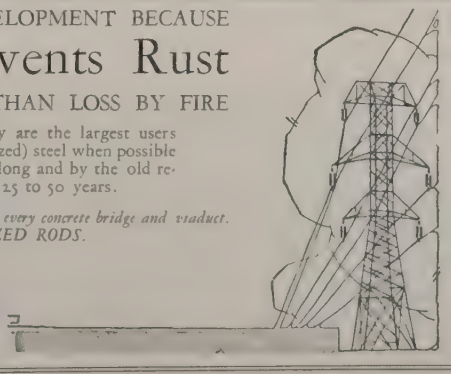
WE CAN MATERIALLY AID THE SOUTH'S DEVELOPMENT BECAUSE

Galvanizing (Coating Iron or Steel with Pure Zinc by Hot Process) Prevents Rust

WHICH EVERY YEAR COSTS THE U. S. A. MORE THAN LOSS BY FIRE

This fact is recognized by all hydro-electric power companies. They are the largest users of galvanized steel structures, and they always use zinc coated (galvanized) steel when possible to secure it. We galvanize beams, angles, rods, etc., up to 30 feet long and by the old reliable hot dip process. This produces a coating that will last from 25 to 50 years.

Rusting Reinforcing Rods expand and destroy concrete. Cases are found on nearly every concrete bridge and viaduct. Prominent engineers have discovered the remedy in GALVANIZED RODS.

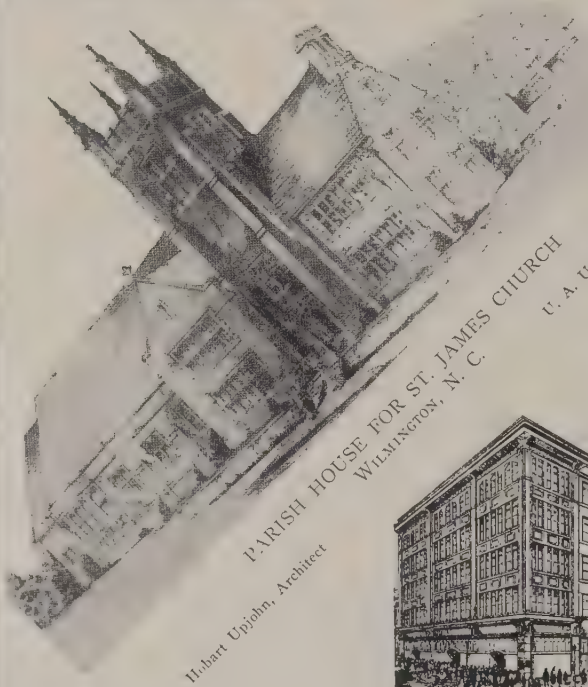


Bessemer Galvanizing Wks.

Offices: BIRMINGHAM, ALA., American Trust Bldg.
Works: BESSEMER, ALA.

FOREST PARK HIGH SCHOOL
BALTIMORE, MARYLAND

Parker, Thomas and Rice, Architects — J. Henry Miller, Inc., Builders



PARISH HOUSE FOR ST. JAMES CHURCH
WILMINGTON, N. C.
Hubart Upjohn, Architect — U. A. Underwood, Builder

BATTERY PARK HOTEL, ASHEVILLE, N. C.
W. S. Stoddard, Architect — J. M. Geary, Builder

IVEY DEPARTMENT STORE, CHARLOTTE, N. C.
W. H. Peeps, Architect — McDevitt-Fleming Co., Builders

DIVINE MILLWORK CO.

WILMINGTON, NORTH CAROLINA

FEATURING ARCHITECTURAL WOODWORK IN HARDWOODS

Atlantic Coast Line Passenger Station
FORT MEYERS, FLA.
A. M. Griffith, Architect — Built by owner

Some SHIMER PRODUCTS

This is the time to look over your stock of Heads and Bits and make Specification of the Articles Needed

FOR Flooring, Ceiling, Siding, Ship-Lap, Jointing, etc.

These Tools have the Make-Ready built into them to eliminate perplexities; to save time and labor, to increase capacity, to solve the problems of economical wood-working. The Bits are divided into upper and lower series from a central line of the cut, and set upon seats inclined to give the leading bit-points a perfect clearance, acting the same as a saw tooth when set.

CROSS-GRAINED and knotty lumber, finished smoothly with uniformly shaped tongue and groove outlines.

Maple or other hard woods are well finished with bits of superior carbon steel. High Speed Steel Bits furnished when desired.

FOR Door, Sash and Blinds, where the patterns must be of equal shape on both sides of the groove, and where the coping bits must produce the exact counter-part of the sticking. In all work of this nature the Shimer Cutter Head is especially helpful.

FOR special patterns of mouldings and grooving work, with or without the coping parts to fit, these tools apply to the best possible advantage for the saving of time and labor

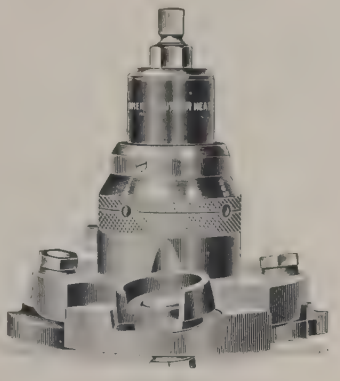


Fig 202

Our Business Centers Around the SHIMER CUTTER HEAD

WHICH has been developed along distinct lines in pursuit of labor saving advantages. Step by step it established a system by which fine work may be done with ease and common-place methods. Many little details very essential to the performance of good work, enter into the construction of a SHIMER CUTTER HEAD rendering it more practical, reliable, durable, complete. They meet the general demand as an every-day trade builder and business promoter and make good under a 30 day test trial, or money refunded.

FOR Matching Double Ceiling or Ceiling made in double thickness and afterwards re-sawed into two separate tongued and grooved boards we design special heads and bits, self-clearing, uniform cutting, practical and serviceable.

If you match thin ceiling in quantity it will pay you to try these Double Ceiling Heads.

SHIP-LAP Heads, to be of real service must be of the "always ready" kind, interchangeable with flooring or jointer heads, thus assuring quick changes without a change of machine guides. Every mill-man understands the value of interchangeable tools, and the uniform quality of work these tools produce.

REVERSIBLE and One-Way Cutters, moulded to agree with your needs, with two, three, or more cutter wings, carefully backed for clearance, work well on any shaper. All sizes, all shapes.

ROSETTE and other small cutters having a central stem to be held in a chuck are especially handy for the many little jobs that come into the average wood-working plant. They always do their part in the saving of time and thereby swell the earnings of the average man.

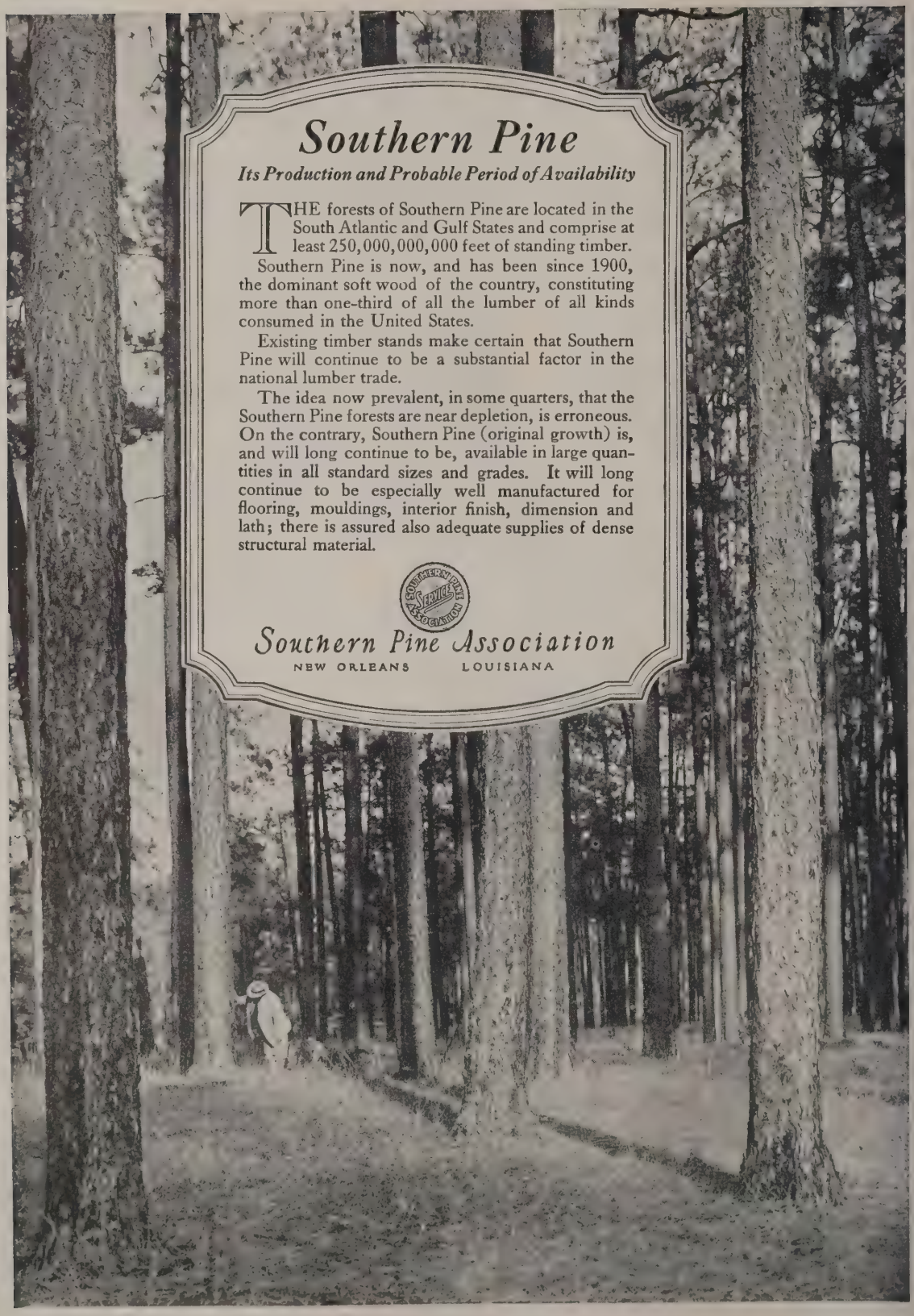
SAMUEL J. SHIMER & SONS, *Inc.*

MANUFACTURERS OF

Matcher, Ship-Lap and Jointer Heads; Double Ceiling, Glue Joint and Batton Heads; Door, Sash and Cope Heads, etc.

Send for 220 page Catalogue—DO IT NOW

MILTON, PENNSYLVANIA



Southern Pine

Its Production and Probable Period of Availability

THE forests of Southern Pine are located in the South Atlantic and Gulf States and comprise at least 250,000,000,000 feet of standing timber.

Southern Pine is now, and has been since 1900, the dominant soft wood of the country, constituting more than one-third of all the lumber of all kinds consumed in the United States.

Existing timber stands make certain that Southern Pine will continue to be a substantial factor in the national lumber trade.

The idea now prevalent, in some quarters, that the Southern Pine forests are near depletion, is erroneous. On the contrary, Southern Pine (original growth) is, and will long continue to be, available in large quantities in all standard sizes and grades. It will long continue to be especially well manufactured for flooring, mouldings, interior finish, dimension and lath; there is assured also adequate supplies of dense structural material.

SOUTHERN PINE ASSOCIATION

Southern Pine Association

NEW ORLEANS LOUISIANA

GUMWOOD—ONE OF AMERICA'S FINEST CABINET HARDWOODS

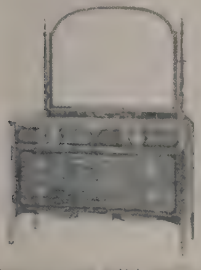
One of Nature's riddles

THE pattern in figured gum[illegible] obeys no laws, it ramifies thr[illegible] the wood at random. Fine effects are eagerly sought for modern interiors

Gumwood for solid parts permits extra value in design, construction, finish, and surface woods used

Entire base and carved end supports of America[illegible]

All but the inlaid top is gumwood



[illegible]

[illegible] *ornamental panels*

Long esteemed abroad
now appreciated at home

EUROPE has always recognized the exquisite beauty of a certain American hardwood. Spain pays duty on it, as an "imported" wood of surpassing quality. Cabinetmakers of other countries have long prized its rare individuality, with a texture resembling satin.

Today America acclaims its own

Virgin [illegible] American G[illegible]

American Gumwood proudly asserts its name and title to a leading place among cabinet hardwoods. Architects now panel the lobbies of many of our most pretentious hotels with richly figured panels of this native wood, finished in its own natural delicate coloring. Modern homes are enriched by the characteristic warm tones of plain gum woodwork.

The wood that brings good furniture within reach

Furniture manufacturers have long valued American gumwood in the construction of their best furniture; its structural qualities are proved. It readily takes a finish in harmony with other hardwoods combined with it. More actual value may be put into the design of the piece, in the artistic treatment of other woods selected for surfaces, when gumwood is used for solid parts. The utmost in design, construction, and finish is achieved, with maximum economy. Ask any furniture dealer.

Retail stores the country over offer for sale good furniture in which American gumwood is used; they so advertise it, and endorse it to the public.

Write the Gumw[illegible] Service Bureau of the Hardw[illegible] Manufacturers' Institute, Memph[illegible]

The NEW ARLINGTON HOTEL

HOT SPRINGS NATIONAL PARK
Arkansas

MANN & STERN
Architects

Latest Addition to World's Famous Hotels Installs ARKANSAS SOFT PINE

Satin-like Interior Trim

Prominent among distinguished watering places of the globe, Arkansas' famous spa, Hot Springs National Park, enters the season of 1924-1925 with the magnificent *New Arlington Hotel* ready to receive guests. Ranking in design, appointment, cuisine and service with the finest hosteleries of America and Europe, it is dispensing hospitality according to historic southern tradition.

In carrying out the skillfully planned decorative scheme responsible for an extraordinary charm and home-like atmosphere in the guest rooms, Arkansas Soft Pine Satin-like Interior Trim has been used as woodwork throughout the upper floors. Finished in white enamel, its beautiful surfaces blend harmoniously with the soft gray of the walls and contrasting colors of the draperies.

In an estimated cost of $2,500,000, the item of woodwork was a relatively small percent. Rare and expensive woods could have been used without materially affecting the total. Yet Arkansas Soft Pine Satin-like Interior Trim, long and thoroughly known to the architects for fine texture, close grain and even absorbing qualities peculiar to itself, was promptly specified without question.

Arkansas Soft Pine, produced in abundance, is a woodwork of consumate satisfaction under white or tint enamels. When treated with stains, it develops a surface, rich and beautiful. May we confirm these statements with all the facts as given in our interesting literature and shown on our finished panels? They are yours for a postcard mailed now.

All stock bearing the Arkansas Soft Pine trademark is manufactured and sold exclusively by the following companies:—

ARKANSAS LUMBER CO.
Warren, Ark.

CROSSETT LUMBER CO.
Crossett, Ark.

DIERKS LUMBER & COAL CO.
Dierks, Ark.
Sales Office: Gates Bldg., Kansas City, Mo.

EAGLE LUMBER CO.
Eagle Mills, Ark.

EDGAR LUMBER CO.
Wesson, Ark.

FORDYCE LUMBER CO.
Fordyce, Ark.

FREEMAN-SMITH LUMBER CO.
Millville, Ark.

GATES LUMBER CO.
Wilmar, Ark.

HALPIN-NEIMEYER LUMBER CO.
Hot Springs, Ark.

OZAN-GRAYSONIA LUMBER CO.
Prescott Ark.

SOUTHERN LUMBER CO.
Warren, Ark.

UNION SAW MILL CO.
Huttig, Ark.
Sales Office: Boatman's Bank Bldg., St. Louis

WISCONSIN AND ARKANSAS LUMBER CO.
Malvern, Ark.

Composing the

ARKANSAS SOFT PINE BUREAU

1140 Boyle Building — Little Rock, Arkansas

THE SATIN-LIKE INTERIOR-TRIM

If you want insurance against repair bills, specify

"TIDEWATER"

CYPRESS. It is not enough to say "Cypress." It is necessary to say

CYPRESS, THE WOOD ETERNAL

AND THEN say YOUR Cypress must be "TIDEWATER."
Then, you identify it by this Cypress Arrow trade-mark.

This is important to your investment and to your permanent satisfaction BECAUSE there is a species of "upland" Cypress that grows far inland, that is not in a swamp and that consequently lacks the historic rot-resistant trait of the true "Wood Eternal."

Only responsible mills can apply the Cypress Arrow to their products.

With this protection you cannot be misled and will avoid loss and disappointment. It is a good idea to "let your dealer know you know." He will respect you—and supply you.

Write us if you have any trouble getting the Genuine Identified "Wood Eternal."

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1332 Poydras Building, New Orleans, La., or
1332 Graham Building, Jacksonville, Fla.

Bradley Brand
FINISHED HARDWOODS

Our immense operation, situated in the heart of Our Own Virgin Forests, enables us to finish our products to the highest degree possible at far less than average factory cost

SCIENTIFIC KILN DRYING

Preserves within our products all of nature's sturdy and beautiful qualities. Modern machinery and skilled workmanship is the reason why so many furniture manufacturers and retail lumber dealers will tell you

"If it's
BRADLEY'S
it's better"

Our FURNITURE STOCK is Kiln Dried, cut to size and machined to pattern — Ready for the assembling room

STRAIGHT OR MIXED CARS:

Oak, Gum and Beech Flooring
White and Red Oak Trim
Sap and Red Gum Trim
Oak Wagon Stock
Aromatique Red Cedar Closet Linings
Oak Mouldings
Sap and Red Gum Mouldings
Yellow Pine Trim and Mouldings

The Furniture Manufacturer and the Retail Lumber Dealer will find our prices interesting

BRADLEY LUMBER CO.
OF ARKANSAS

Double Band Mill, Factories and General Offices: WARREN, ARKANSAS

It's Nothing New—

13 16-inch dressed lumber has been produced from NORTH CAROLINA PINE for generations. Our mills have always manufactured this maximum thickness out of commercially dry one-inch stock in their effort to uphold the standards established by the pioneers of the industry—*and they will continue to do so.*

BUT THIS SIZE IS NOW KNOWN AS

EXTRA STANDARD

and these boards are branded on the end at our mills to guarantee their full dimensions.

SOUTHERN PINE SALES CORPORATION
1236 WOOLWORTH BUILDING NEW YORK
CHARLES HILL, *General Sales Manager*

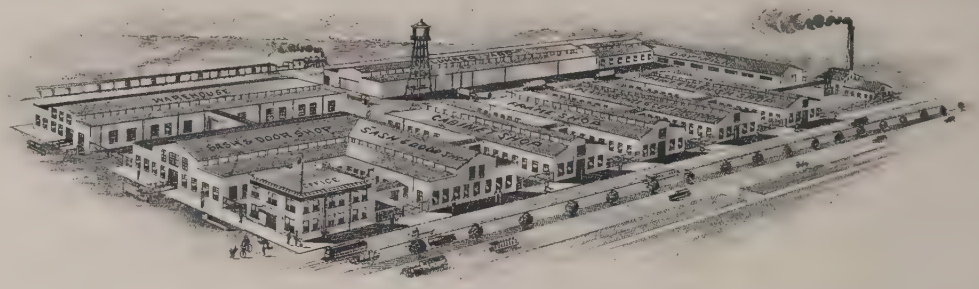
ATLANTIC COAST LUMBER CORPORATION

GEORGETOWN, SOUTH CAROLINA

Largest Lumber Manufacturers on Atlantic Coast

OUR PRODUCT IS SOLD BY

SOUTHERN PINE SALES CORPORATION



Growing with the Town of Jackson

FROM a small plant in a mere village to "The South's Greatest Mill Work Plant" in "Mississippi's Greatest City" is the achievement of the Enochs Lumber and Manufacturing Company. This steady growth and success we attribute to the high standards of quality upon which this business was founded and which has always been maintained.

In 1923 fire destroyed the old plant, but from its ashes has arisen our present large modern plant, the buildings of which are practically all fireproof, the working conditions admirable and the grounds and surroundings most attractive.

This plant supports 3% of Jackson's population, and there has always existed cordial co-operation between the employees and the management. This helps us maintain our standards of high quality and good service to our customers which has existed for the last 33 years.

We are manufacturers of Sash, Doors, Blinds, Millwork and Interior Finish, and we welcome you to become one of our customers

ENOCHS LUMBER AND MANUFACTURING COMPANY
JACKSON, MISSISSIPPI

CUMMER LUMBER CO.
CUMMER CYPRESS CO.

JACKSONVILLE, FLORIDA

Manufacturers of

CYPRESS LUMBER
FRUIT and VEGETABLE PACKAGES

MINERS OF

CRUSHED LIME ROCK - Roadway Material

GREAT SOUTHERN'S HISTORY-MAKING REFORESTATION OPERATIONS ASSURE OUR TRADE A SUPPLY IN PERPETUITY

BOGALUSA

Trade-mark Reg. U. S. Pat. Off.

"NOT ONLY THE LARGEST, BUT THE BEST ORGANIZED, SAW-MILL OPERATION IN THE U. S."

GREAT SOUTHERN LUMBER CO., Bogalusa, Louisiana

We are pleased to quote promptly on request.

FOR HIGH STANDARD MILL CONSTRUCTION.

The designer, the builder and the owner of the best types of "mill construction" factories, warehouses and office-buildings, know that the BOGALUSA Trade-mark on every timber, board and bundle is their complete guaranty that the wisely rigid exactions of the Factory Mutuals, the American Society for Testing Materials and the American Railway Engineering Association have been scrupulously adhered to *at the source.*

Capacity 1,000,000 feet daily

Great Southern Lumber Co.

Bogalusa, Louisiana

R. L. DOWLING & SONS

MANUFACTURERS OF

DENSE LONG LEAF YELLOW PINE LUMBER *and* TIMBER

PROMPT SHIPPERS

LONG DISTANCE AND LOCAL PHONE 814

Capacity 3,000,000 Feet Per Month

BRADENTON, FLA.

SOLICIT YOUR INQUIRIES

STEAMER SHIPMENTS THROUGH TAMPA OR ALL RAIL

S. H. BOLINGER & CO.

MANUFACTURERS HIGH GRADE

YELLOW PINE LUMBER

SHREVEPORT, LA.

GENERAL SALES OFFICE

712 CONWAY BUILDING - - CHICAGO

LONG LEAF YELLOW PINE

Dimension Boards, Flooring Finish
Shiplap Siding Ceiling Lath

We cut timbers up to 60 feet and dress up to 24x30"
A modern mill with 200,000 feet daily capacity

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DISTRIBUTERS

HOUSTON, TEXAS

Large stocks and assortments always on hand

Southern Lumber & Supply Company

Wholesale and Retail Dealers in

PINE AND CYPRESS
Rough and Dressed

MILL WORK OF ALL KINDS IN LATEST AND BEST STYLES

Specialties:

HIGH GRADE SCREENS, DOORS AND SASH, TURNING, SCROLL AND CABINET WORK

TAMPA, - - FLORIDA

BEAUMONT SASH AND DOOR CO.

MANUFACTURERS

SASH AND DOORS
AND
SPECIAL MILL WORK

CARRY IN STOCK

Complete Line of Glass
Hardwood Etc.

PLANT AT
FOURTH AND CROCKETT
BEAUMONT :: :: TEXAS

WE have grown with the South. Forty-four years of Honesty and High Quality are the reasons.

Manufacturers and Wholesalers

SASH, DOORS and BUILDING MATERIALS

Exclusive Manufacturers
MADE RIGHT MILL WORK

CHAS. T. ABELES & CO
ESTABLISHED 1880
LITTLE ROCK, ARKANSAS

SASH and DOORS

Manufactured from

SOFT SOUTHERN YELLOW PINE

Why go North or West for your Sash and Doors when we are manufacturing them here in the South out of lumber grown in the South?

BOOST AND USE HOME PRODUCTS

We specialize in car shipments of stock Sash and Doors. Write us for prices before placing your next car order.

WILLINGHAM SASH & DOOR CO.

MACON GEORGIA

SATISFACTION GUARANTEED

Special

MILL WORK

to ARCHITECTS' SPECIFICATIONS

FOR more than 40 years the Phoenix Planing Mill Company has been furnishing the highest grade of Millwork obtainable In meeting our customers' requirements, we bring to bear the accumulated experience of all these years—an intimate knowledge of building and building conditions throughout the South.

Of many of Dixie's finest buildings and residences it may be written: "Millwork furnished by Phoenix" Today, and in the years to come, we pledge ourselves to continued quality, maintenance of moderate price and painstaking co-operation with each and every customer.

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OCEAN CITY LUMBER CO.

DELRAY, FLORIDA

Building Supplies

WEAVER BROTHERS

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SPECIALIZING IN ROUGH STEAM DRIED FINISH AND SODA DIPPED YARD STOCK

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Gulf Red Cypress

Southern Hardwoods

Cypress Mill Located at
CHIPLEY, FLORIDA

Hardwood Mill Located at
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LONG *and* SHORT LEAF PINE

WRITE OR WIRE US FOR SERVICE

WE believe that a great help in developing any section of the country is the ability of procuring lumber and building materials at low cost. We have always endeavored to keep our prices low and quality high. We sell lumber of all kinds, sash, doors, millwork, lime, cement, plaster, nails, brick, wall-board, roofing, metal lath, etc.

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Planing Mills: A. C. L. and A. B. & A. Rys., Thomasville, Ga.
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LONG LEAF YELLOW PINE
Heart Railroad Materials a Specialty
We are equipped to furnish *immediate requirements* in yard stocks, dimension, boards, flooring, ceiling, finish, lath and timbers
C. G. Hull Lumber Co.
INCORPORATED
Manufacturers and Wholesalers LAUREL, MISS.

H.D.FOOTE LUMBER CO. INC.
Everything in
Long Leaf Yellow Pine
that goes into a Freight Car
ALEXANDRIA, LA.
CAPACITY 100,000 DAILY
IF YOU BUY WHERE YOU GET THE MOST VALUE
you will be interested in our offerings in
TIMBERS, DIMENSION
BOARDS, SHED STOCK
CRATING, BOXES
Write us before you place orders elsewhere
H. D. FOOTE LUMBER CO.
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QUICK SHIPMENTS IN STRAIGHT OR MIXED CARS

J. J. Newman Lumber Company
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SOUTHERN PINE LUMBER
LATH, SHINGLES, CRATING
BOX SHOOKS
ALSO
POPLAR, GUM, OAK
Mills at
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AND BUDE, MISSISSIPPI
General Sales Office:
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Townsend Sash, Door and Lumber Co.

LAKE WALES, FLORIDA

Largest and Oldest Lumber and Building Material Concern in the Ridge Country

Manufacturers of

FRAMING LUMBER, FLOORING, CEILING, SIDING AND FINISH

SASH, DOORS, FRAMES, SCREENS, CABINET AND STAIR WORK, INTERIOR FINISH AND ALL KINDS OF MILLWORK

ORANGE FIELD CRATES, CRATE MATERIALS, CAR STRIPS, NURSERY STAKES

W. Granville Taylor

Manufacturer and Wholesaler

HARDWOOD LUMBER

YELLOW POPLAR, BASSWOOD
OAK, CHESTNUT, HICKORY
BIRCH, CHERRY, MAPLE
TOUGH WHITE ASH, WALNUT

SAW MILLS
Western North Carolina and Eastern Tennessee

PLANING MILL *and* ASSORTING YARDS
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SAW MILL CUTTING ASH EXCLUSIVELY
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ASHEVILLE, NORTH CAROLINA

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YELLOW PINE

Lumber, Ties, Timbers and Piling are shipped to all points desired. Especially do we invite orders from Canada, Mexico and the West Indies.

Shipments are made promptly upon request

BEAUMONT LUMBER COMPANY

ESTABLISHED 1906

BEAUMONT, TEXAS

ACME LUMBER COMPANY, *Inc.*

MANUFACTURERS OF ALL HEART PITCH PINE

Dealers in

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BRICK, CEMENT, BUILDERS' HARDWARE and
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Specially Prepared for
Foundry, Forge, Water Gas, Domestic
A Size and Preparation for Every Purpose.

"Imperial" Washed
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The Ideal Forge Fuel

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Service Boxes, Valve Boxes, Roadway Boxes, Cast Iron Plumbers' Specials

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SOUTHERN PROGRESS
MILBURN Welding and Cutting Apparatus, from the smallest torch to the largest industrial gas generating plant.
Milburn Portable Carbide Lights for:
TEXTILE MILLS QUARRIES RAILROADS
MINES SHIPYARDS INDUSTRIALS, ETC.
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The Alexander Milburn Company
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"Service Built In Equipment"

WE have the distinction of being the first manufacturing concern in the South to buy advertising space in the Manufacturers Record, 42 years ago. The continued use of its advertising columns is in a large degree responsible for our growth from a two-man foundry to a modern plant covering seven acres, now employing several hundred men and serving not only the Southeast, but Cuba, Mexico, Central and South America.

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TANKS AND TOWERS
MUNICIPAL CASTINGS

BOILERS ENGINES PUMPS

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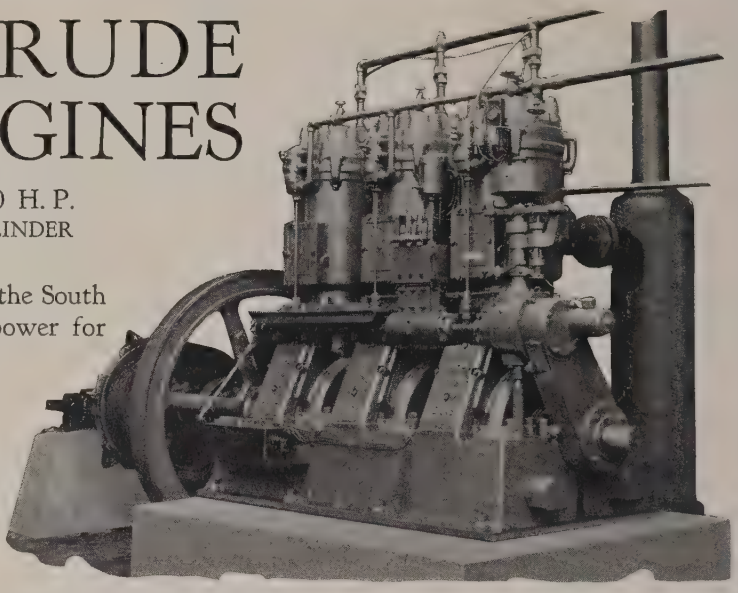
30 TO 250 H. P.
1 TO 6 CYLINDER

In all kinds of plants over the South and Mexico, producing power for $0.0035 per H. P. Hour.

OFFICES, AGENTS AND JOBBERS IN PRINCIPAL CITIES



Write for Bulletin and visit our plant when in Austin

TIPS ENGINE WORKS

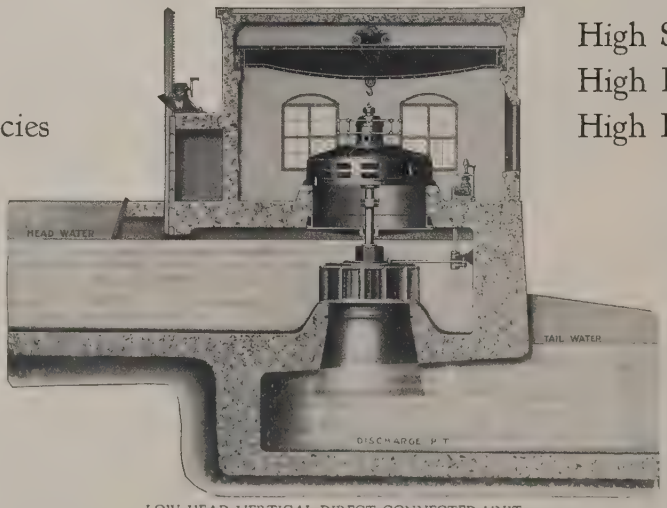
AUSTIN TEXAS

ESTABLISHED 1899

LEFFEL TURBINE WATER WHEELS

High Speeds
High Powers
High Efficiencies

We have many vertical and horizontal turbines driving some of the finest hydro-electric installations and textile mills thruout the South.



LOW HEAD VERTICAL DIRECT CONNECTED UNIT

High Speeds
High Powers
High Efficiencies

We have been continuously designing and building many types of turbine water wheels since the establishment of this Company in 1862.

The James Leffel & Co., Springfield, Ohio

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MINNEAPOLIS, MINN., Plymouth Building
LANCASTER, PA., Woolworth Building
PETERBOROUGH, ONT., CANADA, William Hamilton Co., Ltd.

In the Vanguard *of* Southern Progress

COMPARATIVELY a few years ago the operator of the average steam plant following in the footsteps of Noah regarded Grate Bars and Grate equipment as merely "something to hold up fuel." As a result, however, of persistent effort and a campaign over a period of some 10 years, to which this Company has contributed many thousands of dollars, this same operator has come to realize the importance of installing under his boilers up-to-date Grate equipment designed along scientific lines to obtain the highest efficiency and maximum results from the fuels consumed, which is a long step in the direction of conserving the coal pile and bank account.

SIDE VIEW

THOMAS
WIGGLING, SHAKING, DUMPING
GRATE BARS.

Make a poor steaming boiler a free steamer.
Reduce the fireman's labors.
Cannot get out of fix and refuse to work.
Save their cost in fuel in a few weeks' use.
Eliminate the cleaning period.
Eliminate grate bar mishaps and shut downs.
MATERIAL—True Semi-Steel, the metal which withstands the actions of high temperatures several times as long as gray iron.

FOR DETAILED INFORMATION WRITE

Thomas Grate Bar Co.
BIRMINGHAM, ALABAMA

Branch Sales Offices:
HIPPODROME BUILDING, CLEVELAND, OHIO
410 BOND BUILDING, WASHINGTON, D. C.
RAILWAY EXCHANGE BUILDING, CHICAGO, ILL.
NO. 2 RECTOR STREET, NEW YORK

We invite inquiries for steam and turbine lubricating oils, greases, gasoline, naphtha, kerosene, gas oil, fuel oils, Diesel engine oils, road oils, etc.

You will find Empire Products and Service up to the highest standard, with unusual value. Let us refer you to some of the many concerns in your line that we serve regularly.

Write, wire or phone our nearest office for prices or service.

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ONCE-ALWAYS

EMPIRE
REFINERIES, INC.

SUBSIDIARY CITIES SERVICE CO.
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STEVENS
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Manufacturers of High Grade Refractories

ATLANTA GEORGIA

SUPER — AMERICAN — DIXIE

FIRE BRICK

PREPARED
FIRE CLAY

FOLLOW THE
DIXIE LINE

DIXIE FIREPROOFING
COMPANY
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Marine *and* Stationary
BOILERS

REPAIRS TO STEEL
and
WOODEN VESSELS

8000-TON DRY DOCK
1500 AND 600-TON MARINE RAILWAYS

Charleston Dry Dock
& Machine Company
Successors to VALK & MURDOCH CO.
CHARLESTON, SOUTH CAROLINA

JAMES SUPPLY COMPANY
JUST RIGHT SERVICE CHATTANOOGA, TENN.

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FACTORY
FOUNDRY
TEXTILE
RAILROAD
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CONTRACTORS

SUPPLIES

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HEAVY HARDWARE
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A force of trained men handle each Department.
"We Give Service and Sell Supplies"

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FOUNDRY, FURNACE,
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DOMESTIC COKE

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for fullest enjoyment and health benefits travel on the well-appointed steamships of the Merchants & Miners

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One of the Ashland Fire Brick Company's Plants at Ashland, Ky.

A Pioneer in the South's Great Fire Clay Industry

SINCE the first fire brick plant in Kentucky was built by Ashland in 1886, the quality and uniformity of the Kentucky fire clays has become nationally recognized,

Ashland Fire Brick are now extensively used from coast to coast, and the present three Ashland plants have a combined capacity of 125,000 nine-inch equivalent daily.

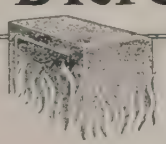
In addition to being highly refractory, of uniform dimensions and texture, tough and resistant to abrasion, with low spalling and high clinker resisting qualities, Ashland Fire Brick is particularly noted for its high fusion point (3182° - 3254° F.) and its resistance to slag penetration.

It has established an enviable reputation in boiler settings, rotary cement kilns, vertical and rotary lime kilns, oil burning furnaces, glass house service, blast furnace and stove linings, iron cupolas, coke ovens and general use.

ASHLAND FIRE BRICK CO.

Incorporated *1886*

ASHLAND, KENTUCKY



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All Standard and Special Refractory Shapes

CUPOLA LININGS
In Stock for Prompt Shipment

MILLED FIRE CLAY
In Bulk or Burlap Bags

FACE BRICK IMPERVIOUS BUFFS FACE BRICK

In beautiful ranges of color harmony and moderately priced

ALABAMA CLAY PRODUCTS COMPANY, *Birmingham, Alabama*

A High-Grade Line of

BURNED CLAY PRODUCTS

Augusta Rough Texture Brick
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Augusta Smooth-Face Brick
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Hollow Building Floor and Partition Tile

Our Territory: THE SOUTHEAST

Write for prices and full information regarding these products.

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ALL KINDS OF

Concrete Construction

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Owned and Operated Plants

LITTLE ROCK, ARK.
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PINE BLUFF, ARK.

FACE PIONEER BRICK TRADE MARK REGISTERED

PIONEER Face Brick
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Hollow Building Tile
Common Brick

PIONEER Face Brick in all shades of Red, Brown, Tan, Gray, etc. Will send samples anywhere prepaid.

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FIREPROOF MATERIALS

Sidewalk Doors
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REINFORCING STEEL

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ENGINEERING SERVICE

BLUEFIELD WEST VIRGINIA

Appreciation—

for sixty years of patronage by our friends of the South.

We earnestly hope that we may be of more and greater service as our South continues in its steady growth.

ESTABLISHED 1864 INCORPORATED 1883
The OTIS HIDDEN CO.
WHOLESALE DISTRIBUTORS
FLOOR COVERINGS - FURNITURE
WINDOW SHADE MFGRS.
LOUISVILLE

Wholesalers of Rugs, Carpets, Linoleum, Furniture, Etc. Also manufacturers of Window Shades for 41 years.

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Offices and Factories: Baltimore, Md., and Mobile, Ala.

Manufacturers of

ASPHALT SHINGLES
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ASPHALT PLASTIC ROOF CEMENT,
LIQUID FIBRE COATING,
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COVERS THE SOUTH

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Manufacturers of

LOWE'S METALLIC PAINT
for TIN, IRON OR SHINGLE ROOFS, RAILROAD CARS, BRIDGES, BARNS, WAGONS, Etc.

ECLIPSE MORTAR COLORS
RED, BROWN, BUFF AND BLACK BRICK AND CEMENT BLOCK COLORING, Etc.

For Durability, Covering Power and Permanency of Color THEY HAVE NO EQUAL

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Conveying and Power Transmitting Machinery

ELEVATING AND CONVEYING MACHINERY FOR HANDLING ALL KINDS OF MATERIAL

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COLD ROLLED STEEL SECTIONAL FLIGHTS—WEAR LONG—EVENLY BALANCED—RUN TRUE

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We also Make ALUMINUM, BRASS, CAST IRON, COPPER, GALVANIZED and MONEL METAL CONVEYORS

WELLER MFG. CO.

1820-1856 N. KOSTNER AVENUE
CHICAGO, ILLINOIS

"SINCE 1896"

Inseparably Linked With The Industrial Development of The Southwest

Our long experience and large stocks enable us to assume the responsibility of supplying Machinery, Equipment, Supplies and Repair Parts for every industrial need.

We plan, build and equip Electric Light and Power Plants, Water Works, Pumping and Irrigation Projects, Cotton Oil Mills and Refineries.

In addition to a general line of industrial and oil field machinery, we also supply machinery for Builders and for Road and Street Building, Ditching and Dredging.

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BRIGGS-WEAVER MACHINERY COMPANY, *Dallas, Texas*

SINCE 1896 "THE HOUSE OF SERVICE"

Any Size—Large or Small—in

Ice-Refrigerating Machines

We are now manufacturing Ice and Refrigerating Machines especially adapted for the requirements of

HOTELS, INDUSTRIAL PLANTS, ICE CREAM PLANTS, PRODUCE HOUSES, DRUG STORES, RESTAURANTS, MEAT MARKETS, PRIVATE RESIDENCES, ETC.

CAPACITIES

Ice-Making: ½ to 5 Tons
Refrigerating: 1 to 10 Tons

COMPRESSION PROCESS—*Use raw water, direct from well or hydrant.*

Belt driven—can be operated by any form of power. Simplicity of type is such that these machines can be operated by inexperienced help.

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"First in the Business"

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BLUEFIELD COAL AND COKE CO.

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Pocahontas-New River Genuine Raven Red Ash

High Volatile Gas and Steam

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Special Attention Given Cotton Mills and Oil Mills

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J. B. McCLARY, *President* ADAMS, ROWE & NORMAN, *Sales Agents*

We Serve the South

ESTABLISHED 1855

Steam Retort—Our Own Make

We pride ourselves in having equipped more canning plants in the South than all others. Complete outfits for fruits, vegetables, sea foods and citrus fruits.

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A. K. Robins & Co.

INCORPORATED

BALTIMORE, MARYLAND

Manufacturers of Canning Machinery and Supplies

MOORE MOIST AIR KILNS

Instrumental in the Progress of the South

MOORE DRY KILN COMPANY

"KILN BUILDERS SINCE 1879"

JACKSONVILLE, FLA. ⟷ NORTH PORTLAND, ORE

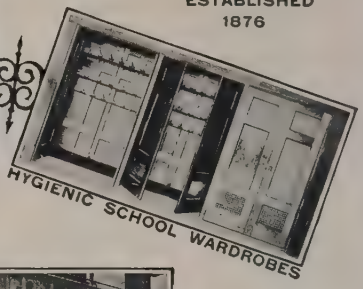
2 FULLY EQUIPPED PLANTS

Wilson

ESTABLISHED 1876

SECTIONFOLD PARTITIONS

ROLLING STEEL DOORS



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SEND FOR DESCRIPTIVE CATALOGS

THE J. G. WILSON CORPORATION, 11 E. 36TH ST., N. Y. C.

Manufacturers also of Shavings Exhaut Fans, Plexiform Fans, Complete Heating and Ventilating Systems, Air Washers, Leather Dryers, Chinook Radiation, Air and Gas Scrubbers.

B T U For Factory and Warehouse Heating

Whether the weather conditions are very severe or only sufficiently cold to require limited heating equipment, the Bayley Thermo Unit exactly fits the conditions.

It uses only as much steam as is required for comfortable working conditions and may be easily regulated to any desired temperature.

The secret of its efficient operation is the air, forced through specially designed steam coils by a Plexiform Fan, and out into all corners of the room in a steady, warm—not hot—current. By taking the air supply from outside, a perfect heating and ventilating system is secured—simple as a stove and much less troublesome and much more effective than stove or direct steam radiation.

Let us explain the B. T. U. more fully. Further information on request.

Bayley MANUFACTURING CO.

762 Greenbush Street, Milwaukee Wis.

BELKNAP *and* "BLUE GRASS"

The World's Largest Single Unit Hardware Plant

In Louisville, Kentucky is located the Belknap Hardware and Manufacturing Co. (Incorporated), "The World's Largest Single Unit Hardware Plant." The Belknap Plant is like a young city. It covers several City Blocks, comprising over one million six hundred thousand (1,600,000) square feet (or 37 Acres) of floor space. All buildings illustrated below connect either with underground passageways, or overhead bridges. Water pressure, heat and power is furnished by their own Power Plant.

The Belknap Display Rooms comprise over 1½ acres of floor space and are considered the finest in the world. Harness, Collars, Saddles and Strap work is manufactured in their own Modern Factory. Their Printing Plant is larger than many successful Publishing Houses. Their Shipping and Receiving facilities are modern. Tracks running directly into the Plant accommodate 14 cars. Sixteen additional cars can be placed on tracks serving various warehouses—thirty two cars in all.

The new twelve story, office and warehouse building illustrated above is the latest word in the efficient and economical handling of their business.

NEW YORK
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CHICAGO
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Cement Products Company

Manufacturers of

PRECAST CONCRETE
SPECIALTIES

"Sanisep" Tanks, Drain Tile, Culverts, Brick,
"Permacon" Building Tile

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BAKER & HOLMES COMPANY

ESTABLISHED

1889 JACKSONVILLE, FLA.
1905 MIAMI, FLA.
1924 ORLANDO, FLA.

DISTRIBUTORS OF ALL KINDS OF
BUILDING MATERIALS
CEMENT ·:· LIME ·:· PLASTER ·:· BRICK ·:· ETC.

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Plumbing *and* Heating Contractors

FUEL OIL ENGINEERS *and* CONTRACTORS
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ORLANDO, FLORIDA

J. A. WALLS

PLUMBING
HEATING
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603 GUARANTY BUILDING
WEST PALM BEACH, FLORIDA

ESTABLISHED 1889

THOMASVILLE VARIETY WORKS
K. E. MACK, *Proprietor*

Rough and Dressed Lumber, Laths and Shingles, Interior trim and Millwork.

We Make a Specialty of Built-Up Colonial Columns, any Size or Length

THOMASVILLE GEORGIA

ROLESVILLE
NORTH CAROLINA GRAY GRANITE

BUILDING STONE RUBBLE STONE
CROSSWALKS CEMETERY CURB
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PAVING BLOCKS STREET CURBING
LANDSCAPE FLAGGING
MONUMENTAL STOCK
CRUSHED STONE

Dimension Stock for Bottom Bases a Specialty

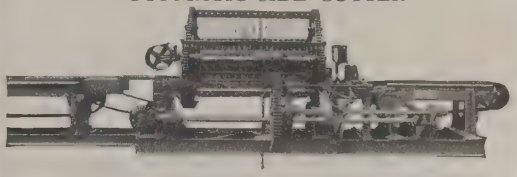
Raleigh Granite Co.
RALEIGH NORTH CAROLINA

Prices and Samples Upon Application

Clay Working Machinery
PRODUCTS

Side Cutters
Brick Machines
Dump Cars
Disintegrators
Feeders
Hoists
End Cutters
Lift Cars
Crushers
Hollow Ware Machines
Pug Mills
Dry Pans, etc.
Clay Excavators

AUTOMATIC SIDE CUTTER

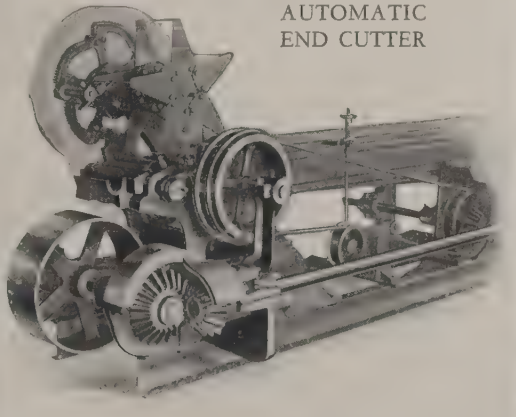


This cutter has a capacity of 15,000 brick per day. Made of high quality material by first-class workmanship, and with its simple and easy movements insure long life.

BRICK AND HOLLOWARE MACHINES

This thoroughly efficient and practical machine is built in six sizes with capacity of 10,000 to 150,000 per day. Side cut is straight barrel.

AUTOMATIC END CUTTER



Used almost universally wherever end cut brick are made. Can be attached to any auger brick machine. Cuts on edge, making one perfect face, dispensing with edger.

J. C. STEELE & SONS
STATESVILLE, NORTH CAROLINA

Western Representative:
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4716 Magee St.
Kansas City, Missouri

Northern Representitive:
MANUFACTURERS
EQUIPMENT CO.
Dayton, Ohio

MOFFATT MACHINERY MANUFACTURING CO.

MACHINISTS AND FOUNDERS

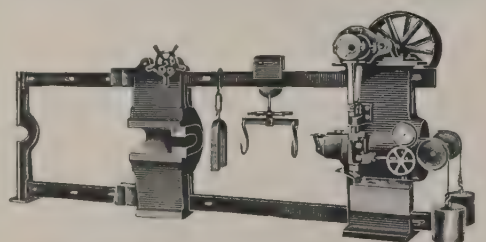
ELEVATORS

HAND—BELT—ELECTRIC
and HYDRAULIC

CHARLOTTE, NORTH CAROLINA

JOHNSON CITY FOUNDRY
and MACHINE COMPANY
INCORPORATED
JOHNSON CITY TENNESSEE
Engineers and Machinists
Boiler and Pattern Makers
GRAY IRON, BRASS *and*
SEMI-STEEL CASTINGS
STRUCTURAL STEEL, TANKS, BREECHING, STACKS *and* SHEET METAL WORK

TOMLIN-HARRIS HYDRAULIC PRESSES



WHEEL PRESSES VERTICAL BUSHING PRESSES FRUIT PRESSES
VERTICAL PRESSES FOR MACHINE SHOPS AND GARAGES
TOMLIN-HARRIS MACHINE CO., Cordele, Ga.

WARSAW ELEVATOR COMPANY

T. FRANK WILHELM, *Manager*

SPECIAL ATTENTION
GIVEN TO
REPAIRS

OFFICE AND WAREHOUSE:
Mercer, Grant and Water Streets
BALTIMORE, MARYLAND

In the South's Development

NO Industry has shown more marked improvement than that of sheet metal manufacturing, and to George Dowman goes much credit for the rapid advancement in this line of work.

Having been engaged in this line of work for about forty years (beginning when only hand tools were used to manufacture sheet metal products, until the present day when machinery is used almost exclusively to manufacture these products), he has perfected and placed on the market such items as "Dixie Ventilators," hollow metal windows, hollow metal and kalamein doors, and was among the first to manufacture stamped metal ceilings and ornamental zinc work.

Mr. Dowman's first connection was under the name of Moncrief-Dowman Co., which a few years later was changed to the Dowman Mfg. Co., and after a few years of rapid growth the corporation, under the name of Dowman-Dozier Mfg. Co., was formed. Mr. Dowman was a member of this company for 18 years and about four years ago sold his interest in this company and is now the head of a sales and erecting organization under his own name selling all kinds of metal products.

His lines include practically every product manufactured from sheet metal and rolled steel, and is prepared at all times to furnish and erect complete materials of this nature.

George Dowman

Sheet Metal and Rolled Steel Products

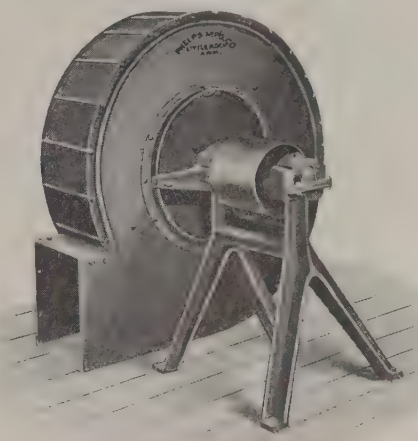
610-11 Walton Bldg., ATLANTA, GEORGIA

"Our Reliability is Your Guarantee"

PHELPS

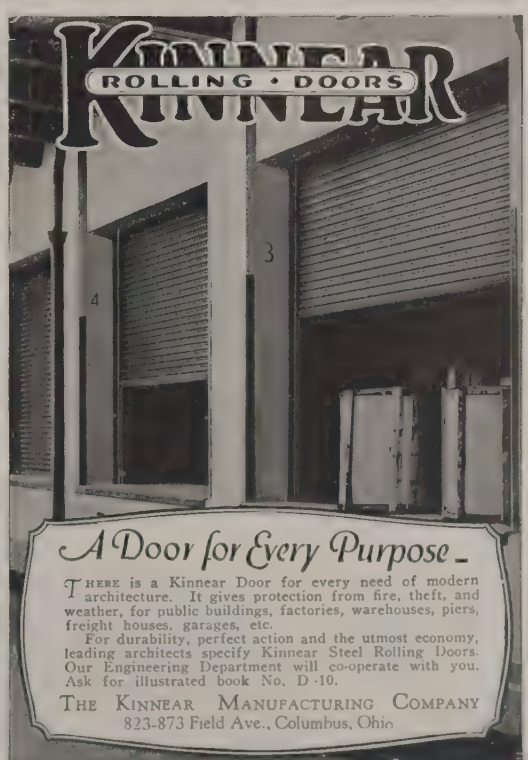
BLOWERS *and* EXHAUST FANS

"More and Better Service for Less Money."



MANY REPEAT ORDERS FROM LARGEST CONSUMERS OF FANS EXPLAIN THE ABOVE SLOGAN. LIST OF CONSUMERS AND CATALOG ON REQUEST. DEALERS WANTED IN SOME LOCALITIES.

Phelps Manufacturing Co. LITTLE ROCK ARKANSAS

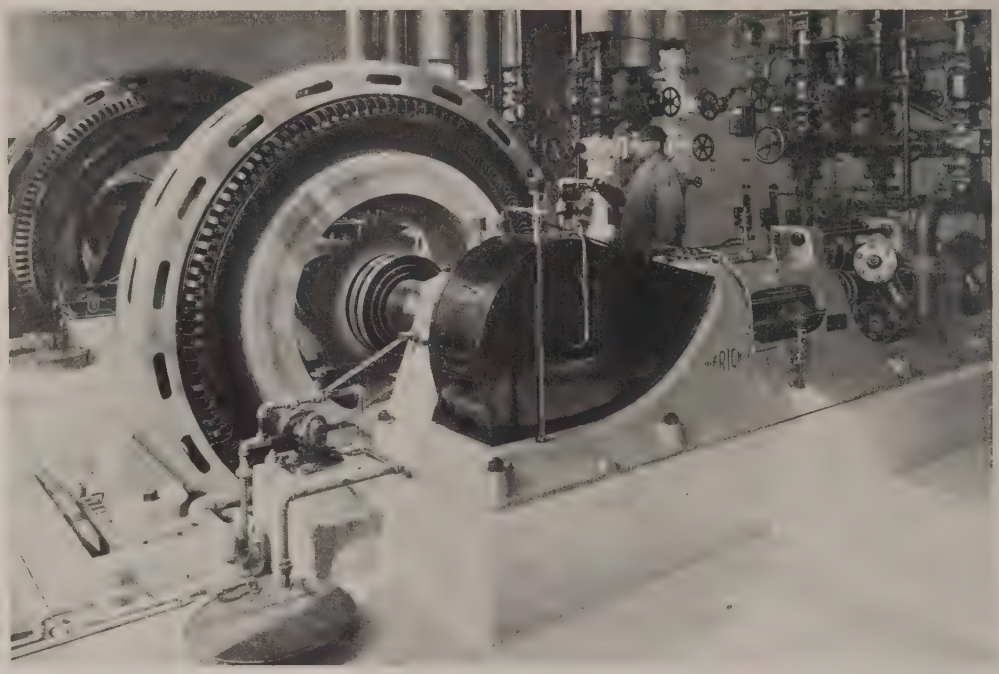


A Door for Every Purpose

THERE is a Kinnear Door for every need of modern architecture. It gives protection from fire, theft, and weather, for public buildings, factories, warehouses, piers, freight houses, garages, etc.

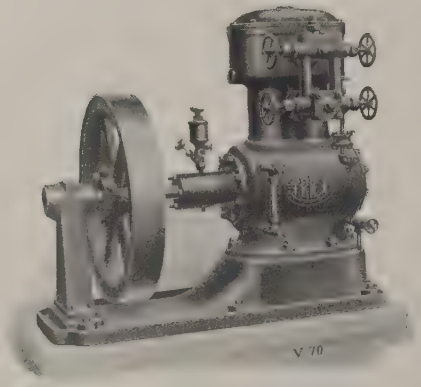
For durability, perfect action and the utmost economy, leading architects specify Kinnear Steel Rolling Doors. Our Engineering Department will co-operate with you. Ask for illustrated book No. D-10.

THE KINNEAR MANUFACTURING COMPANY
823-873 Field Ave., Columbus, Ohio



Two Horizontal Duplex Frick Compressors in an Ice Cream Plant—Note Triple Suction Pipes

In Fifty Great Industries



FRICK REFRIGERATING EQUIPMENT
is built to suit any requirement
ICE PLANTS
COLD STORAGE PLANTS
MARINE REFRIGERATION
GENERAL REFRIGERATION
Smallest to largest

FRICK REFRIGERATING MACHINES ARE PLAYING A VITAL PART

They are used in the making of such varied products as dynamite and glue, steel and silk, rubber and perfume, insulin, bread and ice.

Frick ice-making and cold-storage plants all over America and in twenty-five foreign countries make Frick Refrigeration an integral part of national life everywhere.

The reasons for the world-wide utility of Frick Refrigerating Equipment are given in illustrated booklets, "Ice and Frost"—your copy will be gladly sent on request. When writing, please mention the work you wish to do.

FRICK

Frick Company
WAYNESBORO, PA., U.S.A.
ICE MACHINERY SUPERIOR SINCE 1882

FRICK

Distributors in all principal cities

50

Fifty Years Ago

—just when the South was beginning its present era of Progress and Development, the York Manufacturing Company was organized and incorporated. The beginning was in a small way, with steam engines and boilers constituting the major portion of our output. Our first Ice Machine was built in 1885, but our rapid growth began in 1897, when the present management assumed control, and our efforts were turned to building Ice Making and Refrigerating Machinery exclusively.

Because the South, with its warmer climate, has greater need of Mechanical Refrigeration, it was only natural that York Products should play an important part in Southern Development. With the aid of York Mechanical Refrigeration and ice produced by York equipment, Southern fruits and produce have been more profitably marketed thruout the North and West, as well as other distant points. Mechanical Refrigeration has also added materially to the health and comfort of Southern life.

Forseeing this natural need of Mechanical Refrigeration, the York Organization began years ago to build up a chain of Service Branches thruout the South Some of the results of this building are shown in the accompanying illustrations, but the results of the engineering of our Service Organization can not be pictured, for it has meant untold wealth to Southern Industry.

No matter in what part of the South you may be located, there is a Branch of the York Organization near you. Consult our engineers on all matters pertaining to Mechanical Refrigeration or the manufacture of ice.

ATLANTA

BALTIMORE

NEW ORLEANS

HOUSTON

MEMPHIS

ST. LOUIS

YORK MANUFACTURING COMPANY, YORK, PA.

Builders of Ice Making and Refrigerating Machinery Exclusively

Federal Phosphorus Company

First to Commercially Produce
Phosphoric Acid in the
Electric Furnace
by the
Condensation and Electric Precipitation
Method

Phosphoric Acid 75% H_3PO_4
Sodium Phosphates
Ammonium Phosphates
Calcium Phosphates
Phosphoric Acid Paste

Ferro Phosphorus 24% P

Federal Phosphorus Company

Works: ANNISTON, ALABAMA

BIRMINGHAM, ALABAMA

BETTER

Think of fertilizer in terms of crops

BUY your fertilizers for the results you hope to obtain. There is no other basis upon which they can be bought with safety.

Select fertilizers of known quality and performance—of assured uniformity. That is true economy.

And to be sure of both results and economy, specify S. A. C. brands. Made by an organization that has for many years concentrated its research and its energies in the South, the Southern Agricultural Chemical Corporation's fertilizers meet every Southern soil requirement.

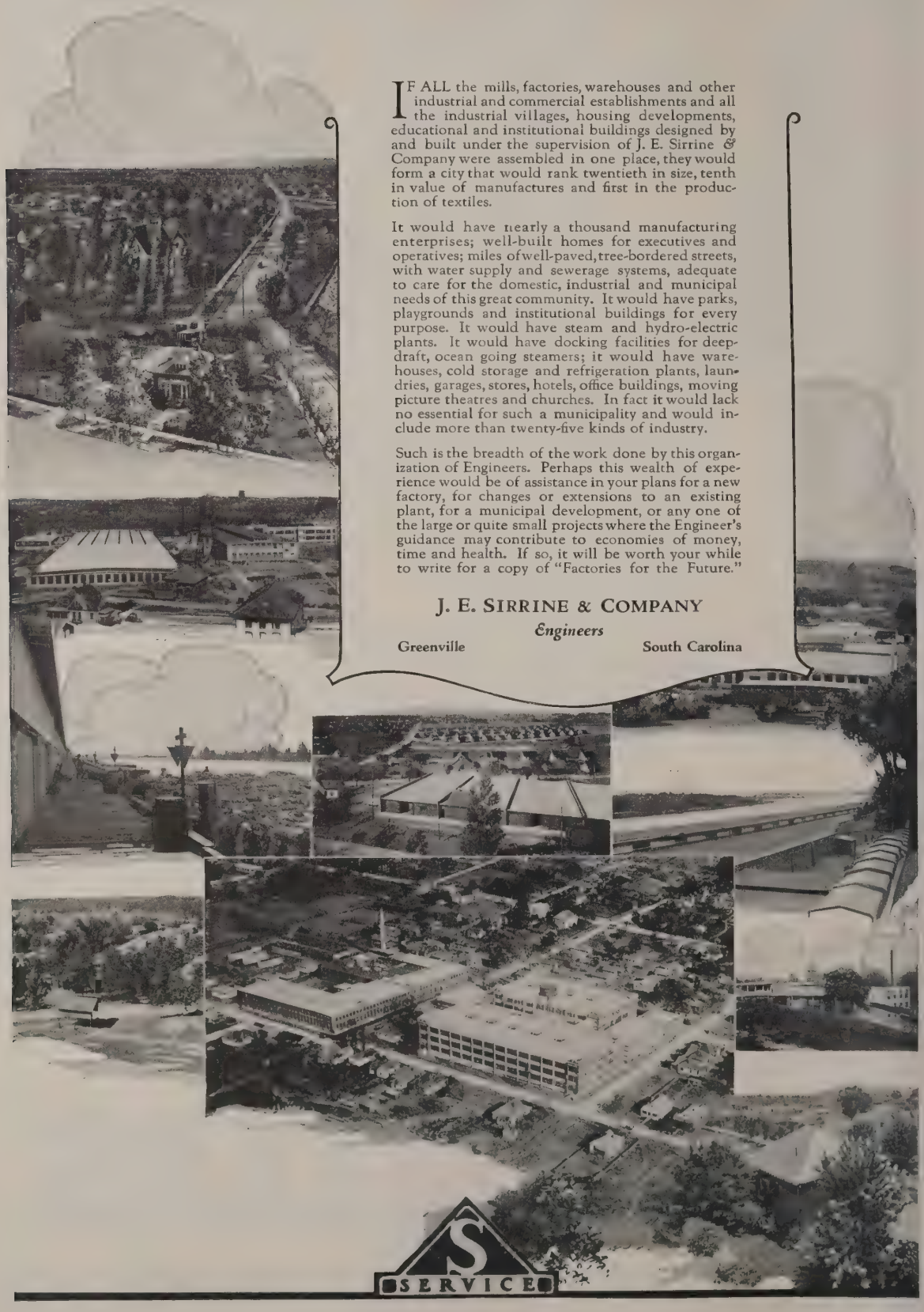
For results insist upon S. A. C. Acid Phosphate and Mixed Fertilizers.

S. A. C. Quality is most rigidly maintained—
and supported by unequalled shipping facilities

Shipped in bulk or in bags.

Southern Agricultural Chemical Corporation
DIVISION (TENNESSEE COPPER & CHEMICAL CORP.)
1207 Atlanta Trust Company Bldg., ATLANTA, GA.

FERTILIZERS



IF ALL the mills, factories, warehouses and other industrial and commercial establishments and all the industrial villages, housing developments, educational and institutional buildings designed by and built under the supervision of J. E. Sirrine & Company were assembled in one place, they would form a city that would rank twentieth in size, tenth in value of manufactures and first in the production of textiles.

It would have nearly a thousand manufacturing enterprises; well-built homes for executives and operatives; miles of well-paved, tree-bordered streets, with water supply and sewerage systems, adequate to care for the domestic, industrial and municipal needs of this great community. It would have parks, playgrounds and institutional buildings for every purpose. It would have steam and hydro-electric plants. It would have docking facilities for deep-draft, ocean going steamers; it would have warehouses, cold storage and refrigeration plants, laundries, garages, stores, hotels, office buildings, moving picture theatres and churches. In fact it would lack no essential for such a municipality and would include more than twenty-five kinds of industry.

Such is the breadth of the work done by this organization of Engineers. Perhaps this wealth of experience would be of assistance in your plans for a new factory, for changes or extensions to an existing plant, for a municipal development, or any one of the large or quite small projects where the Engineer's guidance may contribute to economies of money, time and health. If so, it will be worth your while to write for a copy of "Factories for the Future."

J. E. SIRRINE & COMPANY

Engineers

Greenville **South Carolina**

S SERVICE

It is worth your while to remember that there is at the service of the South a large and experienced organization familiar by long contact and study with the conditions and requirements of southern industry and ready to assist you in working out your particular problem. If you are considering a paper mill, a turpentine extraction plant, the utilization of any waste, a chemical plant, the development of a process, a new outlet for a raw material, or a survey or appraisal of your property, our experience is at your command.

Arthur D. Little, Inc.
Chemists — Engineers — Managers
Cambridge, Massachusetts

WE ARE DEBTORS

To Contributors

WITHOUT the co-operation of the many men who have written special articles for THE SOUTH'S DEVELOPMENT, this publication, in all its fullness and richness of information, could never have become such a reality as it is.

Since the development of the South will inure to the prosperity and power of the entire country, every man who contributes in one way or another to the upbuilding of the nation through the upbuilding of the South renders a service to the entire country.

We feel, therefore, that the men in public life and the business leaders who so readily responded to our request for special articles for this publication have done a patriotic work which will redound to the welfare of our common country. It is needless to say that they have made us their debtors while they have become national benefactors. They have helped to present a comprehensive view of the South's resources and potentialities which will broaden the knowledge of the whole country as to this part of our common land, resulting in the investment in the years to come of hundreds of millions of dollars in the South, and every dollar wisely invested there is an investment for national advancement.

To Advertisers

While returning our thanks to these contributors, we wish also to express our appreciation of the advertisers who have made this publication a possibility. In its preparation and distribution, without counting anything for the overhead expenses or the work of our entire force for many months, it will represent an expenditure of from $60,000 to $70,000.

Without the co-operation of hundreds of business concerns and individuals whose advertisements are to be found in these pages it would have been impossible to carry out such an enterprise. Moreover, it would have failed of real interest to the extent to which it will now appeal to the public. A newspaper purporting to represent a city or a section in which it is published would without advertising be practically a dead issue.

The virility of a community, large or small, or of a section is measured by the way in which its people advertise and thus seek publicity.

Every advertiser in THE SOUTH'S DEVELOPMENT, whether located in the South or North or West, is a contributor to a publication aimed to bring about greater national prosperity, a wider knowledge in other sections and abroad of the achievements of the South and the opportunity which it offers as a field for larger development.

With hundreds of millions of dollars seeking investment in European enterprises and securities, overlooking the almost measureless opportunities in the empire of the South for safer investment than Europe can afford, it is appropriate that at the present time this publication should go to the world showing in its reading and in its advertising pages alike the opportunities which the South presents for a nation-wide campaign for the upbuilding of the whole country through the fullest utilization of the vast resources of the South.

We extend to our advertisers our profound appreciation that through their co-operation this work is made possible, and we trust that through the months and years to come they will share in the increased prosperity brought to the South by reason of the world-wide publicity which will be given to the facts about this section to be found in THE SOUTH'S DEVELOPMENT.

We venture to say that the influences which THE SOUTH'S DEVELOPMENT will set in motion will ultimately bring billions of capital to this section.

The South's Development

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The Upbuilding of the Nation Through the Upbuilding of the South

IN THE life of a country half a century seems a brief span, but in the life of an individual or a business enterprise it seems very long.

It is not given to many men to be identified with one single line of work for fifty years, and yet that has been the privilege of the editor of the MANUFACTURERS RECORD. Fifty years ago this fall he entered the office of the Journal of Commerce of Baltimore, a commercial and financial paper of high standing established in 1850, and he has been continuously engaged ever since in newspaper work.

While acting as assistant editor of the Journal of Commerce its owner was urged to establish an industrial paper devoted to the South. Out of that suggestion came a change in form and name of the old paper to the Journal of Commerce and Manufacturers Record. At the end of six months it was seen that there was some conflict between the shipping feature and the manufacturing or industrial feature, and the owner of the paper was urged to separate them and make two papers. He declined to do this, but suggested his willingness to sell the Manufacturers Record end of the business on long time without any cash payment. The offer was accepted, and the new paper was started without capital or credit in the fall of 1882. Thus while the MANUFACTURERS RECORD standing alone is 42 years old, if judged by the usual newspaper rule of being dated from the establishment of the paper out of which it grew, it might really claim 74 years to its credit.

In the first editorial, on November 23, 1882, it was stated that "there is a need for a paper which will adequately represent the manufacturing interests and keep abreast of the rapid improvement in the material advance of the South. In this chosen sphere it will more fully cover whatever pertains thereto than has been possible in the past; and while the MANUFACTURERS RECORD will give special attention to the manufacturing and mining interests of the South, it will also cover whatever relates to the material development of that section," and the closing sentence was:

"Such a journal as this has long been needed, and as we propose to keep the MANUFACTURERS RECORD among the foremost papers of its class in the country, we trust that we shall receive the liberal encouragement of those to whose interests the paper will be devoted." The aim of this paper has ever been to upbuild the nation through the upbuilding of the South.

After 42 years of work in carrying forward this program we feel somewhat justified in asking our readers if the MANUFACTURERS RECORD has not maintained the high purpose which was announced in its first issue. During all of that time it has unceasingly worked to the best of its ability and judgment for the welfare of the South. It has criticised where it believed criticism was needed. It has commended where commendation, in its opinion, was deserved and would do good. In its editorial and news policy it has known neither enemy nor friend nor party affiliation of any kind. It has been absolutely independent in expressing its views on economic questions, such as the tariff or finance or railroad problems, or any other great issues before the country. In doing so it has often had to antagonize the views of some of the writer's warmest personal friends, but friendship has never deterred it from doing what it regarded as its duty to the public. It has likewise, on many occasions, commended those with whose policies in general it did not at all agree, but who were at the time doing something which seemed to justify commendation for the good of the public.

This paper lays no claim to any virtue which should not inhere in the work of every newspaper. For itself it only makes the claim, that to the very best of the ability of those who guide its affairs, it seeks to know the truth, and to speak the truth as God gives it the power to see the truth. It claims no infallibility, but at times it antagonizes the position taken by great business and political leaders whose views are supposed by most people to be the final word on the questions discussed. As a background for the views which it may advance it has a consistent and persistent study of national and world business affairs for the last fifty years.

In one sense the name MANUFACTURERS RECORD is a misnomer. In a narrow sense it would convey the impression that the paper is devoted strictly to the manufacturing interests and speaks for manufacturers as a class. This is incorrect. The MANUFACTURERS RECORD represents no class, no one line of thought or industry or general business. In its broadest sense it is a business man's newspaper for the discussion of anything which pertains to the welfare of the country, whether that be politics, religion, prohibition, the tariff, the League of Nations, or any other subject which bears directly on the future of our country.

It believes in a protective tariff as essential to the prosperity of the South and of the whole country.

It believes in the American, or Open Shop, as opposed to the Union, or Closed Shop—not out of any hostility to members of the labor unions, but because it is unalterably opposed to the methods which of recent years have prevailed in the management of labor unions under radical domination.

It believes in high pay for the laboring men of the country, in prices for farm products which will bring prosperity to agriculture, and in restricted immigration, even though many employers have desired a large influx of immigrants in order to increase the supply of labor.

It believes in Americanism and in the fullest development of the South as a part of a great plan for broadening the national life of the country, for here is the most unmixed Anglo-Saxonism of the world.

It believes that through the development of the South, and the vast resources there available, the wealth and the power of the United States as a whole will be enormously increased, and that greater prosperity will come to the people of all sections through the fullest utilization of the South's resources.

This special publication, THE SOUTH'S DEVELOPMENT, is a part of the work, and typical of it, which for 42 years the MANUFACTURERS RECORD has been doing for the South and for the nation. Perhaps this is, up to the present time, the crowning piece of work it has accomplished. Never before, so far as we know, has there been brought together in any one publication such an array of great articles by great authorities. In this respect we believe that THE SOUTH'S DEVELOPMENT is the most important single publication ever issued in this or any other country in behalf of any one section of the world.

We appreciate as a high compliment to this publication, and to the standing which it holds in the nation, the fact that so many men of prominence in national and business affairs, crowded to the utmost limit of time, have been willing to contribute the special articles which make up the following pages. They have, we think, rendered a notable service not only to the South, but to the country. We gratefully acknowledge our indebtedness to them for their co-operation. They have given to this publication a symposium on various phases of Southern life, past and present, from which the investors and the investigators of the world may measure with a fair degree of accuracy something of the limitless future of the South.

When our readers have studied what has been done in Southern business achievement during the last fifty years, when they have read the almost incomprehensibly great facts which stand out like mountain peaks, showing what the South has accomplished in banking, in insurance, in agriculture, in manufacturing, and in every other line of human endeavor, they can then with a broad vision look forward to a growth during the coming years which will as far surpass the prosperity of the present as the progress of this hour surpasses the depth of poverty which like a great pall hung over the South fifty years ago.

Out of the woe and the sorrow and the poverty following the Civil War and the Reconstruction period which ended in 1876, which in itself was far more disastrous than the war, the South has moved forward, slowly at first but with increasing momentum toward the mountain heights of prosperity. It has not reached the summit, but it has reached some vantage points from which, looking back over the weary climb upward, it can see what it has accomplished, and taking courage and catching a new inspiration as it studies the facts of the past, go forward with increasing energy and virility toward the summit where the sun of prosperity will bathe the land from the hills and valleys of Maryland to the far prairie and mountain regions of Texas, and where prosperity will be so universal and so vast that the other sections of America will join in the chorus of thanksgiving for what God hath wrought, because what hath been wrought in Southern development will mean a limitless power for good for all other sections and for the world.

What the Term, "The Solid South," Really Means

ADVANTAGES OFFERED American industries in the Southern states loom larger every day. Profound wisdom is being shown by those industrialists of the North who are turning southward for favorable opportunities that greatly outweigh any drawbacks incident to change of location.

With some of the greatest minds of the country devoting earnest attention to unsound labor conditions in the North, and admittedly failing to stem the tide, sane business judgment dictates the choice of security in that section of the country that has gone through the bitterest crises of war and economic depressions without ever bowing to radicalism.

The term, "The Solid South," has a fuller meaning today than ever. Men are ceasing to apply it solely in a political sense, for its industrial triumphs show that the South stands so solid in an industrial way that politics is overshadowed.

"The Solid South" is the home of solid workmen, solid business men, solid business programs, solid industrial relations, solid economic foundations, solid American principles, solid Americans.

Vesuvius yawns and belches destruction. Inhabitants flee. Later they return, and sober-minded business men of America shake their heads with pity at such folly. But the American business man who is ever striving to build his temple of industry around a rotten framework of anarchistic laborers is flirting with a volcano far more threatening than any to be found in Europe.

The "Solid South" means security for every manufacturer trembling under the whiplash of the anarchistic labor leaders, to every manufacturer hovering under the rim of radical labor's volcano.

No crop failure has ever availed to shake the South's solid foundation for human society, the principal reason being that the South never has sown the dragon seeds of discord that so afflict Northern industries, by discord that fattens the aliens of southern Europe who come to America purely for their own gain and pass around the bread of discontent.

Some have feared that the movement of New England cotton mills to the South would be followed by the bringing of New England mill labor. These New England mill owners, however, are fleeing to the South to get away from the operatives which now work New England mills.

A Menu Card of Food for Mental Nourishment

In the most unique hotel in the South, and probably in many respects the most unique in the world, the menu card gives some particulars regarding every dish prepared for the meal. On this card the guest is told where each variety of food was raised, whether it be the lamb of the mountain or the fish of the sea, and some facts are given as to the method of cooking and the sauces served. Before beginning his repast to be selected from a bill of fare of rich and varied and nourishing food the guest can spend a few moments gaining some idea of what is to be set before him for his physical comfort and the delectation of his palate.

The South's Development contains mental food, rich, rare, abundant and nourishing, sufficient in quantity, quality and variety to meet the needs of every mental palate that needs to be fed on entrancing facts and figures which furnish a feast to brain and soul more stimulating and nourishing than that which the world's most unique hotel can ever furnish to the body. To give our readers a few facts about this food and the dishes which are offered for their delight, we give them this menu card touching on the varieties of mental food to be found in the following pages, that their appetite may be whetted and their enjoyment be made the greater by partaking liberally from day to day and week to week for months to come of the abundant supply of food for every brain which seeks to know something about the South and its relation to the nation's life and to the upbuilding of the wealth and power of our common country.

A feast of fatness, a literary treat, a mental stimulus, a brain expansion, a broadening of nationalism and the spirit of Americanism await every reader of the articles which enrich these pages. Never, we believe, has there been gathered together in any one publication a variety of articles of such commanding value bearing on any section, indeed on any country, as we have been able to secure for this publication. Here are articles which will suit every taste.

The lover of Constitutional history will find a story of the South's part in the formation of this Government which will add to his store of knowledge, for comparatively few, except men of the broadest Constitutional knowledge, could without difficulty recount the things which are to be found in the illuminating story of Harry F. Atwood, president of the Constitution Anniversary Association, Chicago, about the part the South played in the formation of our Government. No Southern man or woman can afford to miss acquaintanceship with these facts. The patriotism of every man in every section will be broadened and his admiration for the South will be deepened as he sees what this section accomplished in the creation of the greatest Government which the world has ever known, and under whose flag there has been created a prosperity such as mankind never before witnessed.

When Mr. Atwood was asked to write a story of the South's part in the building of the nation, he suggested that this should be written by a Southern man, but he was advised that what we wanted was a story written by an outside man who could not by any possible means be charged with a bias in favor of the South, and it was for that reason that many of the articles in this issue by Northern and Western men were secured.

Hon. Herbert Hoover, Secretary of the United States Department of Commerce, gives an equally interesting story, in which he shows how the commerce of Southern ports has grown until the outward and inward trade through South Atlantic and Gulf ports is one of the great factors in the nation's upbuilding. Secretary Hoover shows that the total value of exports from Southern ports for 1921 to 1923, both inclusive, was $1,459,000,000, while for the four-year period from 1910 to 1914 the total from Southern ports was $774,000,000.

The total value of foreign trade, exports and imports, through Southern ports in 1921 and 1923 amounted to $1,774,000,000.

In 1881, or just one year before the Manufacturers Record was established, the total deposits in national and state banks in the sixteen Southern states aggregated $221,759,000, while in 1923 these deposits amounted to $5,958,175,000. In 1880 the total bank resources of the South were $650,000,000. In 1923, according to the figures presented by Hon. D. R. Crissinger, governor of the Federal Reserve Board, in his article in this publication, the resources of the Southern banks amount to $8,500,000,000. Mr. Crissinger shows that in 50 years, since 1873, deposits in all the banks in the country have increased twenty-fold, while the deposits in Southern banks have grown almost forty-fold. "This record of growth in Southern banking," says Mr. Crissinger, "is a striking fact reflecting the increased agricultural, commercial and industrial activities in these states."

Some one has said that the two most vital things which a man can consider in this life are preparedness for the life to come to insure his own eternal welfare, and preparedness by insurance to protect his family when the bread-winner has been called away from this world to the other, but that, notwithstanding the facts, the minister of the Gospel and the insurance agent must spend their lives trying to impress these two things upon the men of the country.

Evidently the insurance workers in the South have been successful to a large extent in their effort to make men protect their families, for Southern life insurance companies—that is, companies whose home office is in the South—are now carrying more insurance than all the life insurance companies in the United States carried in 1892, and the people of the South are carrying in home and outside companies almost exactly three times as much insurance as all the people of the United States carried in 1892.

In 1892 the total volume of life insurance in the United States was $4,208,975,473, while at the close of 1923 Southern life insurance companies alone were carrying $4,230,597,539 insurance on Southern people.

The total amount of insurance in the United States at the end of 1923 was $54,800,529,513, and of this amount $12,192,509,280 was on the lives of people living in the South. In view of the fact that comparatively few negroes carry life insurance, the proportion which is being carried by the South is remarkably large as compared with the total for the United States, and, as stated, is three times as great as all of the insurance in force in the United States in 1892. As late as 1900 the total value of new insurance written in the United States was $1,356,769,653, while in 1923 the new insurance written by Southern companies amounted to $1,375,082,984. The premiums

received in 1923 by Southern life insurance companies was $130,935,475.

Probably nothing else in all this publication is more suggestive of the increasing wealth of the South and the tremendous field which it offers in financial and general business operations than these statistics taken from an illuminating article on the growth of life insurance in the South by Robert F. Moore, an insurance expert of Atlanta. In view of the fact that nearly one-fourth of the total insurance in effect in the United States is in the South, it is not surprising that the insurance companies of the East and West are trying their utmost to extend their business in the South, and that many of them are heavy lenders of money in the Southern states. Measured by the growth of Southern life insurance companies in the last 23 years, it is difficult to set a limit to what these companies will show in the next quarter of a century. In all probability they will then rank as among the greatest financial institutions in America.

Hon. Henry C. Wallace, Secretary of Agriculture, broadly discusses the agricultural interests of this section and the outlook for the future, and along the same line Dr. Andrew M. Soule, president of the Georgia State Agricultural College, covers the diversified agricultural activities, showing how the fruit farm, the truck farm and the dairying business are taking the place of the all-cotton system of the past and adding enormously to the prosperity of the agricultural interests—and that means to the prosperity of all interests in the South. This section is now annually shipping over 500,000 carloads of foodstuffs, including cottonseed oil, to feed the North and West. The impression so general outside of the South that this section is mainly a cotton-growing region is wholly erroneous. The facts prove to the contrary. In 1923 the total value of Southern farm products was $6,127,400,000, of which cotton and cottonseed represented less than 30 per cent of the total of the South's farm products.

Of the total production of tobacco in the United States of 1,474,786,000 pounds in 1923 the South produced 1,264,852,000 pounds, or 85 per cent. Tobacco enters so largely into the daily life of a large proportion of the people of this country as well as of those of other lands that the story of the development of the tobacco industry in the South as given by C. L. Franklin, editor of Tobacco, New York, will appeal to a large proportion of the readers of this publication. George Washington and other leaders of colonial days were large raisers and exporters of tobacco, and ever since then the tobacco industry has steadily grown. The extent of our tobacco shipments from the South is indicated in the fact that Hampton Roads ports are annually sending out nearly $100,000,000 of tobacco to foreign lands, and the tobacco industry, mainly Southern, annually pays the Internal Revenue Department over $300,000,000 revenue tax, and to this are added income taxes. The smoker is in evidence everywhere and every puff he makes of pipe, cigar or cigarette is an advertisement of Southern raised and Southern manufactured tobacco. Pre-eminently the creators of this industry from the days of George Washington to the present hour have been Southern men.

Connected intimately with agriculture is the fertilizer industry, which bears such a direct relation to the maintenance of soil fertility. The development of the fertilizer industry, one of the great outstanding interests of the South, pre-eminently the creation of Southern men, has been covered by C. A. Whittle, editorial manager of the Soil Improvement Committee of the Southern Fertilizer Association. And bearing directly on the fertilizer industry is the cottonseed business, for some of the by-products of the cottonseed oil manufacture are ingredients used in the manufacture of fertilizer. Mr. Whittle writes of the cottonseed oil business as well as the fertilizer industry.

The South is an essential part of the Union. The nation's progress is its progress, and its progress is the nation's progress. It is appropriate, therefore, to present in this publication a comprehensive, bird's-eye view of the growth in commerce and industry and finance of the United States during the last fifty years, and these figures are presented by O. P. Austin, statistician of the National City Bank, New York, and for many years chief of the Bureau of Statistics of the Department of Commerce.

The homes of a country are the best index of the character, education and the wealth of the people, and nothing can more clearly indicate the character, education and love of the beautiful than the colonial homes of Virginia, Carolina, Mississippi and other states. These colonial homes are of an entirely different type from those of New England; indeed, as compared with the old homes of New England they stand out like mountain peaks above the valley below them. The best architects in America have for years been striving to imitate the architecture of the old colonial homes of the South. Typical of these homes, of which hundreds might be given if space availed, are illustrations to be found in the article by H. E. Harman, editor of the Southern Architect and Building News, Atlanta, in which he tells something of the story of colonial homes as indicative of the people who occupied them in the days when this Government was being founded, some antedating that period and some subsequent to it.

In these latter days hotel building is becoming the measure of a community or a section's progress. It was once accepted as an axiom that the measure of a nation's advancement was its consumption of coal. Today it may be said that the measure of a country's advancement is the number and character of its hotels and apartment-houses. In this respect the South has been making progress pre-eminently great, and E. J. Williamson, associate editor of the Hotel Gazette, New York, shows that the South is this year spending $250,000,000 in building over 600 hotels and apartments, and the end is not yet, for the outlook promises a still greater activity in the coming years.

One of the strikingly interesting points brought out in Mr. Williamson's letter is that in colonial days Massachusetts had a law prohibiting anyone but licensed innkeepers from providing travelers with bed and board, while Virginia had a law exactly opposite, which provided that unless a traveler himself stipulated that he was to pay for his board and lodging no charge should be demanded of him, no matter where he stopped or how long; nor did it matter whence the traveler came or whither bound, whether he was known or unknown, prominent or obscure. "This spirit of hospitality," says Mr. Williamson, "must surely have been an innate characteristic of the old Southerner, else such a law would not have been adopted." Other facts of equal interest about the way in which Southern planters hospitably welcomed the traveler are given in this article, and also in the one on sugar interests of Louisiana by Reginald Dykers.

In striking contrast with some of these wonderful hotel structures, costing from $1,500,000 to $6,500,000, are some of the old-time hotels of the South, which are illustrated in connection with these modern hotels. Here will be found a picture of the old St. Charles of New Orleans, the center of wealth and fashion and politics, where sugar planters in the days of ante-bellum prosperity foregathered, a hotel worthy of its day, and at that time the most advanced in the country. Here also will be found a picture of the old Ford Hotel in Richmond, built long before

the Civil War, but the center of activity during the days which tried men's souls between 1861 and 1865. In the closing years of the Confederacy one of the sons of the Secretary of War of the Confederacy carried to Richmond from his father's farm a handbag of eggs. He sold them for Confederate money, which filled the bag as full as it had been of eggs, and went to Ford's Hotel to get a moderate lunch. When the bill was presented to him it was for $92, and he told the waiter he might as well bring him a piece of pie and make it an even $100.

We have entered upon almost a new world, certainly a new epoch in human history, in the development of electric light and power. Hydro-electric power and the super-power systems of the country have inaugurated a change in our economic conditions which will probably be as great as any change which has been marked by scientific development during the last century. Out of the extension of hydro-electric light and power to the villages and towns and farms of the country there will come in all probability a decentralization of industry and the uplifting of farm and village life which will bring about a wonderful change for the betterment of the country. Therefore, the story of the hydro-electric development accomplished and under way in the South, with some suggestion as to its potentialities, will prove exceedingly interesting to every reader. This subject is covered by Thos. W. Martin, president of the Alabama Power Company, who in gathering the facts which he presents has had the hearty co-operation of the hydro-electric companies operating from Maryland to Texas.

As the first successful ice machine was made in the South, inaugurating the manufacture of artificial ice and the forerunner of the refrigeration system which has developed the handling of fruits and vegetables and meats, it is appropriate that the story of what ice making and refrigeration have meant to the country and to the world, and the extent of this industry, which already ranks as tenth in importance in the country, should be told in this issue. That story has been written by Terry Mitchell of Waynesboro, Pa., a refrigerating engineer, long familiar with this industry.

The first two railroads built in the United States were constructed in the South. The first 100-mile railroad in the world was in the South. The first locomotive built in America was for a Southern road. The first steamship which crossed the Atlantic was owned in the South and sailed from a Southern port. It is appropriate, therefore, that the whole subject of transportation in connection with the history of railroad building in the South and the influence which this had upon railroad operations in other sections should be given in this publication, and that is done by Samuel G. Wilmer, railroad editor of the Manufacturers Record, who in his story gives an almost infinite number of details gathered here and there through years of investigation, which must necessarily prove of interest not only to every railroad man in the country but to all other men who seek to be well informed on the business problems of the nation.

In the early days prior to railroad building, transportation was done largely by water. For a while railroad competition almost destroyed water transportation facilities, and our rivers fell into disrepute. Within the last few years we are again turning to the rivers and lakes and the harbors, realizing that their fullest utilization means the lowering of freight rates on heavy materials and increased prosperity for the country, and thus, instead of being injurious to the railroads, beneficial to them by the increasing wealth created and the larger volume of higher-class freight thus developed. For years the National Rivers and Harbors Congress has been devoted to the study of ways and means to awaken our country to the importance of the fullest utilization of rivers and harbors as essential factors in the larger prosperity of the country. What has been done in this respect is given in minute detail by S. A. Thompson, secretary of the National Rivers and Harbors Congress, and in connection with his story are many facts of interest as to river transportation in olden days and today, when down the Ohio and Mississippi and the Warrior and other rivers are being floated barges carrying in one tow many thousands of tons of coal and iron and steel and other products which enter into our business life.

The great fight which is being made by the American owners of Cuban sugar lands to bring about a change in our tariff in order to increase the profit of the American refiners who largely own these sugar lands makes extremely interesting and of national importance the story of the innumerable tariff changes on sugar during the last 100 years. Reginald Dykers, vice-president of the American Sugar Cane League of New Orleans, long familiar with every phase of the industry, gives a list of the changes which have taken place in the tariff which will prove startling to those who have not followed this industry, and thus have not understood the handicaps under which it has labored by reason of the uncertainty which has always prevailed from year to year as to whether there will be tariff or free trade, a bounty or no bounty. Probably no other industry in the country has been subjected to such harassing tariff changes as sugar, and this has been a tremendous handicap against the development of the industry, for no man wants to put into any business a heavy amount of money required to establish a sugar plantation or a sugar mill, facing the uncertainty which the sugar growers have faced during a hundred years as to whether a protective tariff will live from year to year, and thus whether the investment which he makes today will be wiped out tomorrow. We commend a study of the tariff changes on sugar to every thoughtful reader of this publication, because in these tariff changes will be found an unanswerable reason why the cane-sugar business has not grown with greater rapidity than it has, and why Louisiana and Texas and Florida, which have the soil and the climate, under a fair protective tariff, to furnish us a large part of our sugar supply to the profit of every business interest, have been retarded in this industry.

Having three-fourths of the coast line of continental United States, the South has a very vital interest in the development of commerce, more especially since a large part of the export trade of this country consists of Southern products, including cotton, tobacco, lumber, steel, phosphate and many other things. Our cotton exports alone from 1870 to 1914 exceeded by $4,000,000,000 the total balance of trade in our favor during that period, and but for these cotton exports it would probably have been impossible to maintain our gold standard. From 1870 to 1924 our cotton and cotton goods exports amounted to $22,365,000,000. It is appropriate, therefore, that Admiral Leigh C. Palmer, president of the United States Fleet Corporation, should review the South's interest in the establishment of a merchant marine and give some facts in regard to the methods which are now being put into effect for the handling of our shipping to the benefit of Southern ports.

The South has over 100,000 square miles of coal area, as compared with about 17,000 square miles for all of Europe excluding Russia, and about 42,000 square miles including Russia. This section thus has nearly six times as much coal area as all of Europe outside of Russia, and that means a power for the creation of industry and wealth which can scarcely be overestimated. Dr. W. T. Thom,

Jr., expert on coal of the United States Geological Survey, gives us many facts of interest in regard to our abundant supply of coal and the small fraction of the total which has been mined and developed. Connected closely with the coal industry is the iron and steel business of the South, the foundation of that being iron ore and coal. Dr. E. F. Burchard, iron-ore expert of the United States Geological Survey, discusses the iron-ore resources of the South, and B. E. V. Luty, a well-known writer on iron and steel interests, tells the story of what has already been accomplished by uniting these ores and these coals in the manufacture of pig iron and the production of steel and the extent to which this growth has already attained. In former years it was necessary for Southern iron producers to ship practically all of their product to the North and the West, but of late years the consumption of pig iron in the South has advanced so rapidly through the development of machine shops and pipe works and kindred interests that the South no longer has to look elsewhere for a market for its pig iron except for a very small percentage, estimated at about 12 to 15 per cent.

Y. A. Dyer of Birmingham, metallurgical engineer, writes of the development of pipe making in the South and the extent of this interest in connection with iron production, while James A. Green, president of the Matthew Addy Company, Cincinnati, for many years one of the foremost authorities on the merchandising of iron and coal and coke, adds some interesting facts in regard to the high consumption of Southern-made iron. Steel ships built at Mobile out of steel made at Birmingham are carrying the steel products of that district to distant ports of the world, while at the northern end of Southern development is the vast plant of the Bethlehem Steel Company at Sparrows Point, Md., representing an investment of largely over $100,000,000, bringing most of its ore from Chile and other foreign lands to unite with coke made from West Virginia coal.

It is altogether probable that no industry in the world's history has been more thoroughly misrepresented and misunderstood in the matter of its labor than the cotton-mill business of the South. Half the world has been made to believe, by the propaganda which originally started in Massachusetts for the express purpose of discrediting the Southern cotton-mill industry, and was taken up by muckrakers and others, that the cotton mills of the South are full of immature children, gaunt and sickly and woebegone. The facts are directly to the contrary. The best mill labor in the world today, based on inherent qualities of independence of action, of sturdy manhood and womanhood, of high moral character, of genuine, unmatched Anglo-Saxonism, is the cotton-mill labor of the South. No other industry in the world's history has ever, we believe, done as much for its employes in proportion to age and money invested as cotton manufacturing in the South. For thirty years or more Wade H. Harris, editor of the Charlotte (N. C.) Observer, has been in intimate touch with the whole cotton-mill industry of the central South. Mr. Harris has written a story in regard to the character of the cotton-mill labor of the South, illustrated by many photographs of cotton-mill operatives. The Rev. J. W. Speake, a Methodist minister of Greenville, S. C., who has been making a study of mill conditions in the South, is so thoroughly impressed with the work which has been wrought by giving employment to these mill operatives, taking them from their little, barren, hillside and mountain farms, that he expresses his views on the subject, regarding the industrial movement in the South, and especially that of the cotton-mill business, as one of the great spiritual influences at work in this section for the advancement of its people.

Mr. Richard Spillane, a widely known editorial writer on business matters, presents a very interesting story based on a personal study of cotton manufacturing and cotton-mill labor in the South which adds greatly to the whole discussion of this subject.

Courtenay De Kalb, a well-known engineer and geologist and publicist, with something of a world-wide experience as an investigator and manager of properties, writes so interestingly on the influence upon the future of the nation of the Americanism of the South that he throws new light upon the subject. His views should quicken the ambition of every Southern man and boy to fit himself for the mighty task to which, in the Providence of God, he has been called.

In the days when men's soul were tried by the poverty following the Civil War the lumber industry opened an opportunity for the utilization of a vast amount of standing timber in this section. Timber lands sold at a dollar an acre or less in many cases where today such lands would command $75 to $80 an acre, but in those days the poverty of landowners increased in proportion to the amount of land they owned, for the taxes were too great a burden to bear. This industry furnished the lumber for building millions of homes in this country, for construction work of all kinds, for railroad ties, for bridge building and all other lines of construction activities. It has been one of the foremost factors in the wealth of the South and in bettering the conditions of the people of the entire country by furnishing an abundant supply of lumber which in former years was sold at beggarly prices. The newspapers have for several years been filled with stories to the effect that the lumber industry of the South is nearing its end by reason of its decreased supply. However, Bolling Arthur Johnson, editor of the Lumber World Review, of Chicago, who has spent much of the last thirty years in visiting the lumber regions of this section, takes an opposite view, and insists that a large lumber business will be one of the permanent sources of industry and wealth of the South, likewise taking the ground that there is no other section of this country where reforestation is so feasible and where the growth of timber is so rapid.

For some years the struggle of the great nations of the world has been to gain control of petroleum fields, for with the introduction of the internal-combustion engine and the use of oil and gasoline as fuel on land and on sea it is recognized that the dominant power in the world in the years to come will largely rest upon the ability to obtain an abundant supply of oil. The South is now producing one-third of the petroleum supply of the entire world. The production in this section last year, as shown by the article by Dr. George R. Hopkins, petroleum expert of the Bureau of Mines, was 367,916,000 barrels out of a total for the United States of 732,407,000 barrels, over 50 per cent of the nation's production and one-third of the world's production. Geological reports estimate that about 55 per cent of all the known petroleum supply still in the ground in this country is in the South. What larger developments may come in the future by reason of new discoveries cannot now be estimated, but that there will be such discoveries goes without question.

It is an old saying that "where the dairy cow enters, there poverty departs," and the dairy cow is becoming an important factor in the diversification and prosperity of Southern agriculture—and that means prosperity of all other interests, for when the farmer prospers the merchant and the manufacturer will prosper. Craddock Goins, editor of two leading dairy papers of Milwaukee, has written of the development of dairying in the South and the almost unlimited field which is before this section for an

expansion of its dairy business, keeping at home the $200,000,000 or more now annually sent to other regions for dairy products, and becoming, as the South should be, the dairy center of the country, as it is better adapted for dairying than any other part of our land.

As the timber supply of the North available for paper making is rapidly disappearing, it is now universally recognized that the future situs of the paper industry of the country must be in the South. Already a good many mills of exceptionally large capacity have been built in this section, and paper-making people and capitalists generally are turning their thoughts to the South as the only inviting place in which to build paper mills. Richard W. Edmonds of New York, who has given much study to the paper-making question in the South, writes on what has been and what will yet be done in making the South the center of America's paper-industry activities.

Good highways, always a matter of prime importance in the development of a country, become more and more a necessity by reason of the automobile and the motortruck. These revolutionizing agencies are changing the whole business and social life of the United States. The South alone has more automobiles than all the rest of the world outside of the United States. It has 1,200,000 more automobiles than the United States had as late as 1915, the total in the South at present being 3,645,563 motor vehicles, against 2,445,664 for 1915 in the entire country. Good highways and automobiles go hand in hand, and the existence of the automobile as a factor in travel and freight traffic means the building of highways. Thos. H. MacDonald, chief of Office of Public Roads, United States Department of Agriculture, tells the story of what the South has already done in highways and highway building, and indicates what must yet be done in this section to carry forward highway work in keeping with the needs of the times.

Few of our readers, we imagine, could give a wild guess at the location of the first Portland cement plant in the South, nor when it was built, nor to what use that plant is now put. Kenneth Rotharmel tells us of the first cement plant which was constructed in the South, which was located at San Antonio, Texas, and which is now an interesting feature of one of the beautiful parks of that city. Tracing the industry from that plant up to the present time, Mr. Rotharmel shows what has been the growth of cement making in the South.

When on a bed of sickness, with parched throat and fevered brow, or where a nourishing but simple diet is required, no man ever partakes of the juice of a Florida orange without feeling that the orange grower is doing something for humanity more than simply carrying on the development of an important industry. No other orange raised in this or any other lands has that delicious flavor of the Florida fruit; and as the Florida orange is superior to all other oranges, so Florida grapefruit stand not only unmatched in all the world, but absolutely without any other country even claiming to be able to produce a competitor. The citrus-fruit industry of Florida is one of the nation's real assets. Its product enters into the homes of the rich and the poor alike and adds immeasurably to the healthiness of millions of people. What Florida has already done in the development of this industry is interestingly told by George M. Chapin of Jacksonville.

In the dark days of Reconstruction the South passed through one of the blackest periods ever endured by a civilized country. None but those who lived in the South at that time can ever comprehend what Reconstruction meant, with all its hates, all its evils, all its swindling of states by "carpet-baggers" controlling negro legislators, or comprehend the extent of these appalling conditions. Not for the purpose of reviving the memory of those times, but merely to show what the South had to endure and how in conquering these adverse influences it saved this great stretch of land from Virginia to Texas, or one-third of the nation's area, from sinking into barbarism, the story of Reconstruction is briefly told by Dr. R. H. Holliday of Oxford, N. C.

For nearly forty years the editor of the MANUFACTURERS RECORD has sought as opportunity offered to dig into the records of olden times and learn some of the things which the people of the Old South were doing before the Civil War. Of the achievements in statecraft and in war made by the South in olden days the world knows something at least, but it has been in almost complete ignorance as to the work of Southern scientists and Southern industrial leaders, who, measured by any standard, will, we believe, prove to be peers, if not superiors, of the business men of any other age or any other country. In justice to the Old South, and in order that the people of the country may understand the inheritance of character which the people of this generation have received from their forebears, considerable space is given in summing up some of the things done by the men and women of the Old South. We have only touched on a few high points here and there, merely enough to give the reader a desire to know more about the Old South and its very wonderful people and their very marvelous achievements.

In order that the material progress of the South may be easily grasped Howard L. Clark, assistant to the editor, has compiled statistical tables showing the progress of each state in nearly every line of activity, agricultural and industrial, the progress of the South as a whole and the progress of the nation since 1880, with many other interesting figures and facts which go to make up this encyclopedia of information about the South.

The Governor of every Southern state with one exception, and his place was taken by the Lieutenant Governor, and the state geologist of every Southern state with one exception, and his place was taken by a professor of geology, promised special articles on their states. All of them have fulfilled their promises with the exception of one or two Governors who are missing from the list up to the time this form goes to press, though constantly reminded that in failing to comply with the promises made they were permitting their states to miss a splendid opportunity of having published in this form the facts as to their educational, agricultural and industrial advancement. The geologists have given invaluable information as to mineral resources and development, and the articles by governors tell in simple, straightforward fashion the progress of their states in education, in agriculture and in industry, giving facts and figures which will do their states a world of good.

This survey of some of the things that appear in THE SOUTH'S DEVELOPMENT is by no means complete, for it gives merely a few outstanding facts in regard to some of the articles which will be found in the following pages. There are other contributors in one form or another covering many other phases of Southern business, but this introductory story or bill-of-fare is already too long, and we must trust to our readers to make a searching study from cover to cover, for they will find on every page information which to many will be an inspiration, and to the country at large an illumination thrown upon the South, past, present and future. They can nourish their mental appetites for months to come in freely partaking and digesting the contents set before them in the following pages.

The South's Development: The Facts of the Present

In 1922, the last year for which statistics on educational expenditures are available, since these figures are only compiled biennially, the South expended upon public schools $815,915,000, which was more than $100,000,000 in excess of what the United States thus expended in 1900, and only about 15 per cent short of what the United States thus spent as late as 1910, though the population of the United States in 1910 was 91,972,000, while the population of the South in 1922 was about 36,000,000.

The increasing rate of expenditure known to have been going on during 1923 and 1924, if the exact figures were obtainable, would really show that the South is now spending a much larger amount on the maintenance of public schools than the United States spent for that purpose in 1910. The reports from Governors of Southern states published in this issue prove a rapidity of increase in school expenditures and in betterment of school facilities startling to those who have not kept track of the progress of the South in educational matters.

During 1922 and 1923 and the first nine months of 1924 the contracts let for school buildings in the South aggregated $178,453,000; during the same period contracts let for church buildings totaled $54,617,000. In both cases no building costing less than $10,000 is included in these figures.

An outstanding feature of the progress of the South is the activity in building schools and churches. To educational and religious advancement the South is dedicating much of its wealth increase.

In 42 years, or from 1880 to 1922, the estimated true value of all property in the South as compiled by the United States Census jumped from $9,177,000,000 to $71,375,367,000, which is $27,733,000,000 more than the total wealth of the United States in 1880, and only $17,142,000,000 short of the total wealth of the United States as late as 1900. The wealth of the South today is four times what it was in 1900.

In the twenty-year period between 1880 and 1900 the South's true wealth increased by $8,700,000,000. In the succeeding eleven years, or from 1900 to 1912, the gain was $22,700,000,000; but in the ten years between 1912 and 1922 there was a gain of $30,743,000,00, or an average annual gain during that ten-year period of over $3,000,000,000.

Every state in the list shows a remarkable increase, and in most of them the total for 1922 is from six to ten times as great as the total value of these states for 1880, and in some cases even more. The total for Florida in 1922 was twenty times as great as in 1880. In North Carolina the total was nearly ten times as great as in 1880; while Oklahoma, which, of course, showed a very small value of $110,000,000 in 1880, jumped to $3,993,000,000 in 1922, its actual increase in that period being larger than the total value in 1923 in a large number of the leading states of the South. The total for Texas in 1922 was nearly twelve times as great as for 1880, while Virginia was nearly seven times as great, and West Virginia eleven times as great.

Today the South has 1,200,000 more automobiles than the United States had in 1915; more, indeed, than all the world, outside of the United States, has at the present time—a remarkable attestation of its increasing wealth and its increasing business activity.

The total individual deposits in Southern banks at the present time, according to the report in this publication of D. R. Crissinger, governor of the Federal Reserve Board, is $5,958,000,000, compared with $1,728,000,000 in 1909 and with $221,000,000 in 1881.

The capital invested in manufacturing in the South, according to the census report of 1920, was $6,883,000,000, which is about two and a half times as much as the

Estimated True Value All Property in the South, by States, and the Total for the United States, 1880-1922

States	1880	1900	1912	1922
Alabama	$428,000,000	$774,682,000	$2,015,430,000	$3,002,043,000
Arkansas	286,000,000	604,218,000	1,721,900,000	2,599,617,000
District of Columbia	220,000,000	928,740,000	1,171,704,000	1,697,270,000
Florida	120,000,000	355,743,000	936,885,000	2,440,491,000
Georgia	606,000,000	936,000,000	2,163,033,000	3,896,759,000
Kentucky	902,000,000	1,365,131,000	2,277,004,000	3,582,391,000
Louisiana	382,000,000	815,158,000	1,989,813,000	3,416,860,000
Maryland	837,000,000	1,317,373,000	2,235,483,000	3,990,730,000
Mississippi	354,000,000	557,582,000	1,234,571,000	2,177,690,000
Missouri	1,562,000,000	3,244,533,000	5,727,948,000	9,981,409,000
North Carolina	461,000,000	681,982,000	1,685,408,000	4,543,110,000
Oklahoma	110,000,000	811,580,000	3,117,546,000	3,993,524,000
South Carolina	322,000,000	485,678,000	1,261,048,000	2,404,845,000
Tennessee	705,000,000	956,672,000	1,883,698,000	4,228,251,000
Texas	825,000,000	2,322,152,000	6,379,592,000	9,850,888,000
Virginia	707,000,000	1,102,310,000	2,402,412,000	4,891,570,000
West Virginia	350,000,000	659,653,000	2,427,930,000	4,677,919,000
Total	$9,177,000,000	$17,919,187,000	$40,631,405,000	$71,375,367,000
United States	$43,642,000,000	$88,517,307,000	*$186,299,664,000	†$320,803,862,000

*Includes $402,352,000, value of ships belonging to the United States Navy, and $290,000,000, value of privately-owned water supply systems; not distributed by states.

†Includes $1,445,992,000, value of ships belonging to United States Navy; $360,885,000, value of privately-owned water-supply systems, and $4,278,155,000, value of gold and silver coin and bullion; not distributed by states.

ESTIMATED TRUE VALUE OF SPECIFIED CLASSES OF PROPERTY, 1922, AND PERCENTAGE OF INCREASE SINCE 1912

States	Real property and improvements, 1922	Per cent increase, 1912-1922	Livestock, 1922	Per cent increase, 1912-1922	Farm implements and machinery, 1922	Per cent increase, 1912-1922	Manufacturing machinery, tools and implements, 1922	Per cent increase, 1912-1922
Alabama	$1,419,872,000	52.0	$84,718,000	*2.5	$26,821,000	50.6	$160,989,000	69.0
Arkansas	1,481,157,000	66.2	74,514,000	*15.6	36,264,000	96.2	48,928,000	60.3
Dist. of Columbia	1,274,899,000	41.3	542,000	*69.8	66,000	*21.4	22,097,000	60.3
Florida	1,551,713,000	261.3	38,716,000	12.5	8,696,000	75.9	74,181,000	157.7
Georgia	1,954,736,000	116.0	101,764,000	*4.4	39,908,000	72.2	159,411,000	76.3
Kentucky	1,864,939,000	63.6	112,090,000	*17.9	34,593,000	57.5	97,856,000	137.4
Louisiana	1,531,235,000	48.8	65,511,000	1.1	28,139,000	64.9	164,146,000	85.9
Maryland	1,968,289,000	46.2	42,821,000	*6.7	20,007,000	59.9	219,387,000	158.0
Mississippi	1,138,959,000	138.9	85,632,000	*4.6	32,900,000	79.0	55,242,000	57.3
Missouri	5,796,306,000	77.5	248,056,000	*19.5	98,586,000	78.2	333,027,000	166.3
North Carolina	2,371,365,000	238.6	103,397,000	21.5	33,853,000	66.6	238,327,000	180.0
Oklahoma	2,072,955,000	21.9	120,136,000	*31.0	57,031,000	87.6	97,857,000	345.5
South Carolina	1,189,944,000	134.8	61,927,000	1.0	32,945,000	111.1	132,579,000	34.0
Tennessee	2,499,378,000	200.4	115,059,000	*8.8	42,982,000	91.0	145,206,000	186.7
Texas	5,962,606,000	65.2	327,807,000	*17.0	105,892,000	70.5	208,339,000	89.6
Virginia	2,772,373,000	135.7	92,653,000	7.8	35,576,000	80.1	164,146,000	146.3
West Virginia	3,250,693,000	132.3	58,043,000	3.7	13,155,000	77.6	119,953,000	99.0
Total	$40,101,419,000	88.7	$1,733,386,000	*10.9	$647,414,000	75.9	$2,441,671,000	116.6
United States	$176,414,444,000	61.5	$5,807,104,000	*6.9	$2,604,638,000	90.4	$15,783,260,000	159.1

* Decrease.

States	Railroads and their equipment, 1922	Per cent increase, 1912-1922	Street railways shipping, water works, etc. 1922	Per cent increase, 1912-1922	Stocks of goods, vehicles furniture, clothing, etc., 1922	Per cent increase, 1912-1922	†Motor vehicles, 1922
Alabama	$295,534,000	22.6	$138,895,000	112.8	$841,718,000	56.7	$33,496,000
Arkansas	278,425,000	23.1	60,667,000	84.3	588,360,000	44.4	31,302,000
District of Columbia	21,231,000	22.6	77,745,000	21.2	280,694,000	71.4	19,996,000
Florida	233,548,000	23.1	62,406,000	113.4	427,125,000	108.2	44,106,000
Georgia	319,619,000	29.7	169,070,000	30.5	1,098,762,000	78.2	53,489,000
Kentucky	314,731,000	22.7	161,468,000	75.8	939,377,000	71.4	57,337,000
Louisiana	264,484,000	22.7	143,488,000	53.7	1,181,418,000	163.1	38,439,000
Maryland	183,100,000	22.8	257,354,000	55.4	1,238,211,000	207.1	61,561,000
Mississippi	213,021,000	22.6	42,757,000	51.2	580,584,000	51.8	28,595,000
Missouri	612,795,000	22.7	404,419,000	51.2	2,342,431,000	110.0	145,789,000
North Carolina	251,694,000	23.0	81,257,000	83.0	1,395,438,000	174.7	67,779,000
Oklahoma	441,267,000	22.7	171,752,000	254.7	942,601,000	25.8	89,925,000
South Carolina	160,166,000	22.7	83,227,000	49.2	708,959,000	93.3	35,098,000
Tennessee	269,323,000	24.3	148,390,000	24.9	957,179,000	100.3	50,734,000
Texas	640,968,000	23.3	385,077,000	123.9	2,030,468,000	41.8	189,731,000
Virginia	501,972,000	22.8	178,308,000	71.7	1,083,429,000	115.1	63,113,000
West Virginia	441,524,000	23.6	133,319,000	98.1	619,935,000	35.7	41,297,000
Total	$5,443,402,000	23.3	$2,699,599,000	71.0	$17,256,689,000	85.1	$1,051,787,000
United States	$19,950,800,000	23.5	‡$15,414,447,000	50.1	¶$80,261,762,000	133.7	$4,567,407,000

†No separate estimate was made for motor vehicles in 1912, they being included under stocks of goods, furniture, vehicles and clothing heading.
‡Includes $1,445,992,000 value of ships belonging to the United States Navy, and $360,885,000, value of privately-owned water-supply systems; not distributed by states.
¶Includes $4,278,155,000 gold and silver coin and bullion; not distributed by states.

capital invested in all manufacturing interests in the entire country in 1880.

The South now has over $1,000,000,000 invested in cotton manufacturing, in contrast with $822,237,000 for the entire country in 1910.

The value of the mineral products of the South in 1922 totaled $1,491,000,000, which is $383,000,000 more than the value of the mineral products of the United States in 1900.

The production of petroleum in the South in 1923 was 367,916,000 barrels, or 158,300,000 barrels more than the production in the United States in 1910, and one-third of the total oil production of the world.

In 1923 the sulphur output of the South was 2,036,097 tons, or eight times the production in the United States in 1910, and 85 per cent of the world's output.

The value of farm property in the South at the time of the census of 1920 was $21,685,000,000, or $1,240,000,000 more than the total for the country in 1900.

The value of farm products in the South in 1923 was $6,127,000,000, which was $1,410,000,000 more than the total for the country in 1900.

The production of tobacco in the South in 1923 was 1,264,852,000 pounds, which was 85 per cent of the total tobacco crop of the United States, or about one-third of the world's output.

The value of exports from Southern ports in 1923 was $1,409,579,000, which was only 19 per cent short of the total figures of export values for the United States in 1910.

The intimate relation of the South to the welfare of the country and, indeed, to the entire world, is strikingly illustrated in the simple fact that of the most important single crop raised in the world—cotton—the South has averaged for many years about 60 per cent of the world's produc-

tion. Our exports of cotton maintain to a large extent the enormous cotton industry of England, which has more than 50,000,000 spindles and a proportionate number of looms, and likewise the cotton industry of France and other continental countries, and to Japan also. Cotton, therefore, enters intimately and powerfully into all the ramifications of the world's trade. It gives employment in the production of the crop and its manufacture to many billions of capital and to millions of people. Our exports of cotton hold the balance of foreign trade in our favor. If it had not been for these exports since 1870, the foreign trade balance would have been so heavily against this country that we would not have been able to maintain the gold standard.

This section is annually shipping about 500,000 carloads of foodstuffs, made up largely of vegetables and fruits, to feed the North and West, and this industry is only in its infancy.

This section is furnishing practically all of the bauxite mined in the United States, on which our aluminum industry is based.

It is mining nearly 200,000,000 tons of coal a year.

It is cutting over 15,000,000,000 feet of lumber annually, and making over 4,500,000 tons of pig iron, much of which is being turned into finished form before it leaves the South.

Steel ships built of Southern steel are carrying steel products made in the South to South America and to the Orient. Steel ships built in the South are bringing iron ore from Chile and other foreign countries to be turned into steel rails and into other steel ships. Two of the greatest shipbuilding plants in the country are in Maryland and Virginia, and an Alabama steel plant was run to 100 per cent capacity, night and day, during the summer and fall of 1924 while plants in other sections were running on about 50 per cent to 55 per cent basis.

The production of fiber or artificial silk, one of the great and growing industries of the day, is being concentrated in the South. There are two immense fiber silk plants in Virginia, one employing 3500 hands and constantly advertising for more. Another plant is being built in Tennessee at a cost of $4,000,000, and another on a very large scale is being built in Maryland. The success of these operations already foreshadows the building of other artificial-silk plants in the South.

Many other lines of industry are being established in the South, while old lines are being rapidly expanded. Over 600 hotels are being built at an outlay this year of about $250,000,000, with the prospect for still larger hotel-building activities in the coming years.

The influence of life insurance companies upon the financial interests of the country can scarcely be overestimated. The vast aggregation of capital in the big insurance companies has made possible much of the financing in other lines of activities and is largely responsible for New York's financial power. Formerly Eastern and Western companies controlled all of the life insurance business. Today Southern life insurance companies are annually doing more business than all the life insurance companies in the United States did in 1892. The value of the insurance carried by these Southern companies exceeds the total value of all United States companies in that year.

The story of the South's achievements, of which these are but a few outstanding points, could be told in an endless strain, but in the special articles which follow such innumerable details are given that it is unnecessary to add others to this brief summary of outstanding activities in the South.

The Trail of Industry Leads Southward

A CONVICTION fixed by rich and informed human experience usually is a very reliable guide, and people who have studied the unfolding of America's development program in the past half-century cannot escape the conclusion that economic events have shaped themselves into a southward stride. A well-ordered movement of manufactures to the South has gained such momentum that there no longer is any doubt that the South's day of recognition in industrial advantages has come.

From enthusiastic discussions of possibilities, we have reached the dawn of actualities. Men no longer dwell so much upon what the South will do as upon what the South actually is doing and how constructively it has built to make itself safe for industry.

Old in the sense of established conditions, the South is pulsating with a new vigor that comes of the developing of its own power. After many years of struggling without the aid of a complete program, it is drawing the industries necessary to balance its agricultural scheme, and rapidly is building up new industries around its mineral wealth.

The South has kept faith. Today it is in the most inviting position for capital of any section of the country. It stands entrenched upon a threshold of explorations into new sources of wealth, in bank clearings, building activities and minimum of unemployment.

The South's economic progress has not developed in spurts, but along lines of consistency, building firmly at the foundation.

This is one of the reasons why there never have been "bread lines" in the South. "Free-lunch" counters have never been known in the South. When newspapers of other sections have prattled over "starvation in the South," in the wake of economic depressions, they have misled their readers. The South's economic system does not permit of starvation conditions. Crises come and go, business men and farmers take losses, but through it all men fight out their own battles, and the movement always is forward, never backward.

Progress in farm diversification is leading to agricultural prosperity. With cotton farming, the world's greatest cotton crop, backed by diversification, Southern planters are in a more advantageous position for making money than farmers of any other section. Good-roads activities have stimulated commercial arteries. School enrollments, the most accurate possible barometer of prosperity, have reached new records. Everything that could possibly be conducive to the success of industries and the well-being of industrial operatives is offered in the South. Long the home of solid, rational, contented workmen and conservative business men, the South has an appeal to capital that will not be denied, attractions that no one can fail to recognize.

To men of calm business judgment there can be no greater appeal than the fact that the South is not building any booms, is not organizing any orgies of sensational promotion schemes, is not exploiting any "gold-brick" proposition, but is calmly continuing away at the work of developing its resources and making itself a more attractive place for gainful industrial and agricultural activities.

There is a restless urge abroad among the manufacturers of the North, and those who have studied the South and its conditions are wondering what has kept them away so long.

As capitalists turn for relief, the trail leads them to the South, the home of rational, contented workmen of the finest breed in the land.

The South's Development

Inheritance of character means more for the future of an individual or a community than inheritance of money. Given inheritance of ability and initiative and energy and managerial power, and a man or a community or a section has in this very inheritance a larger asset, and one of greater potentialities for good, than the inheritance of large wealth.

The South, scarcely realizing how great is its inheritance of character in things which make for material upbuilding and human progress generally, has inherited a wealth—latent here and there, perhaps, to some extent, but nevertheless available for development of business ability, of initiative, of technical skill, of managerial power—unsurpassed by the people of any other country in the world, perhaps unequaled except in limited sections of this country.

The men of the Old South had a peculiar and unique power for doing things. As managers of great business interests involving the control and handling of hundreds, and sometimes thousands of slaves, they developed a power for managerial ability which has never been adequately understood. That is a power or trait which has been descending from the men of the Old South to all generations since.

In the same way there was in the Old South a spirit of scientific investigation and achievement and broad world vision of business resulting in plans for developing the natural resources of the South, and at the same time looking out upon the whole world from the business point of view. As the pioneer iron men of the South, even before Revolutionary days, and long after, seem, as Swank, the historian, said, "to have been born with a genius for iron-making," so the pioneers in geology and chemistry, in agriculture, in railroad building and in other lines of human activity were born with a genius for doing big things.

This has given to the people of the South as a whole, those who are living in the South and those who have gone North and West, an inherited trait of character, perhaps not appreciated or realized by these people themselves, which marks their future as a dominating power in the world of business and science. And what is true in these respects is likewise true in literature, in medicine, in the law and in other professions.

Until the South of today more fully understands the people of the Old South it will never come into a full appreciation of the tremendous asset which it has inherited through this inborn power to achieve. And until other sections realize in full the potentiality of this power of Southern men and women they will never understand why the South could meet the overwhelming odds on the battlefields stretched from Virginia to Texas during four long years of titanic struggle, nor will they be able to understand how, completely crushed as the South then was, it has been able to master problems which no other people on earth ever faced and to make the achievements which have been recorded to its credit during the last fifty years. Only when these facts are fully understood will anyone be able to visualize the potentialities of the future when these inherited traits of character, latent they may be in thousands of people, are fully developed and become united with the natural resources of the South and its geographical location.

It is for these reasons that it has seemed wise in this publication to give considerable space to the story of things accomplished by the people of the Old South in agriculture, in manufactures, in railroad building, in missionary and educational activities. And yet we have only touched here and there on a few outstanding peaks of the achievements of the people of the Old South prior to 1860. For every line that has been written on that subject a hundred—yes, a thousand—could be penned, but the task would be an endless one, and must be left to the historian, who, delving deep into all sources of information, may some day write the true story of what the Old South prior to 1860 did, not only in the building of the nation from the governmental point of view, but in laying broad and deep the foundation for all, that coming generations may be able to accomplish in the utilization of the South's resources to the advancement of this section and to the profit of the whole country.

A GLIMPSE OF THE PAST

The South has often complained of being misunderstood and misrepresented by the people of other sections. It might with equal truth be said that the South has as often been misunderstood by some of its own people and by them been badly misrepresented.

For many years a good many Southern speakers and writers, and some who posed as great orators, though Southern-born and claiming to be Southern in sentiment, did as much to misrepresent the South at home and abroad as even the most avowed enemies of the South. In former years, and to an extent even at present, many people in the North and West, densely ignorant about the South of ante-bellum days as well as the South of the present, believing that the people of the Old South were lazy and thriftless and without broad business abilities, were always tickled to hear Southern men decry the Old South and praise the present South as new and infused with ideas of activity and energy from the North. The average Northern audience, believing that the people of the Old South were without broad business energy and that they were devoted merely to the raising of cotton by slave labor, doing but little work, mental or manual, themselves, hailed with great applause statements to that effect when made by Southern speakers. Every man likes to have his own pet notions confirmed by public speakers, especially by those who pose as leaders. Any Southern orator who desired to win the enthusiastic applause of the Northern press and people could do so at any moment by misrepre-

senting the energy and activity of the Old South and praising the progress of the present as due to the infusion of Northern ideas. It did not take any great quantity of brains, and certainly very little knowledge of the South, to be able to win public favor in the North by such a course. For years they made the young people of the South believe that their ancestors were simply a lot of easy-going, slave-holding cotton planters, and that the religious and educational activities of the ante-bellum South were at a low ebb.

One striking illustration which explains the whole situation was given when in a contest of essays on General Lee some years ago the prize was awarded to an author who in his essay said:

"Intellectually, the South was practically dead. Most of the people were densely ignorant. Hence the great religious and educational movements which in the North had built a church and schoolhouse at every cross-roads had swept by them unheeded."

This statement was passed without criticism or comment by a committee of distinguished educators, two of them being accounted as leading orators and historians of the South! As a matter of fact, the South, with a population of 10,900,000 in 1860 out of a total for the country of 31,000,000, had 20,858 church buildings, while the rest of the country had 33,151. With nearly twice the South's population and more than three times its white population, the rest of the country had only 60 per cent more churches than the South. Including the negroes, the South had a church for every 528 of its population in 1860, while the rest of the country had one for every 616 of its population. Omitting the negroes, the South had one church for every 333 of its white population, or nearly twice as many per capita for its white population as the rest of the country. And yet, according to the prize essay on Lee, the great religious movements before 1860 had passed by the South and left it, so we are to infer, as religiously dead as the same essay says it was intellectually dead.

The Greatest Missionary Work Since the Days of the Apostles—Hundreds of Thousands of Negroes Evangelized by the People of the Old South

As a matter of fact, nearly every church for whites in the South had a large membership of negroes, and in some churches the negro membership was about as large as that of the whites. The work of the Old South in the civilization and evangelization of some millions of negroes just from the wilds of Africa was the greatest work of its kind ever accomplished by any people. Great as was the curse of slavery to the South, rejoicing as every Southern man must do that it has passed away, it is nevertheless a fact that before 1860 the South did more for the enlightenment and betterment of the African race than all other people on earth have done up to the present time. It is safe to say that from the beginning of the Protestant foreign missions in the early part of the Eighteenth Century to the middle of the Nineteenth Century, or about 150 years, the number of conversions to Christianity in heathen lands was not so large as the number of slaves who, under the teachings of consecrated men and women of the Old South, became devout Christians. What the people of the Old South wrought for God and humanity in the conversion to true religion and upright, pious lives of negroes is one of the marvels of civilization and of Christianity. President Coolidge recently expressed the thought that in the workings of Divine Providence, in order to save the negro race from the complete destruction which has befallen many other races, negroes were brought to America, where they could be trained and developed for the good of the whole race.

The importation of slaves into the South was largely in New England owned vessels, and though the South bought slaves after New England found that they were not profitable in that inhospitable climate, a large proportion of its people never believed in slavery and sought its abolition. But so long as the slaves were there, the consecrated Christian men and women of the South did a work of civilization and evangelization which should be recorded to their everlasting credit.

The civilization and evangelization of these millions of negroes gave unmistakable proof of the inherent possibilities for good in the negro race, and of the consecrated work of Christian men and women of the South in olden days in their teaching and preaching and bringing them to an acceptation of Christ as their Redeemer. No more faithful, loyal, devoted Christians than many of these black men and women have ever lived. Nor was there ever to be found a more loyal, devoted people than hundreds of thousands of them to those whom they called masters and mistresses.

Between these two classes there was a sincere, honest devotion. Here and there, of course, were evil-minded men who did not thus regard their obligation to the negro race, and there were some evil-minded negroes who were always controlled by evil influences within themselves. But, broadly speaking, there was respect and love between the two races until after 1865, when all the pent-up venom of evil was let loose against the South, and especially by bolshevistic or "carpet-bag" scalawags who flocked to this section to sow the seed of hate in the heart of the negroes against the whites. To the evils of Reconstruction days must be attributed a large proportion of the ill-will of many negroes to the whites, and of many whites to the negroes, which to some extent still exists; but the real feeling of the best element of the whites and negroes was recently shown in a remarkable way at Columbia, the capital of South Carolina. The facts as given in the Manufacturers Record of September 4 were as follows:

"For thirty minutes all business activities in the city of Columbia, the capital of South Carolina, ceased on August 20. Mayor Coleman had issued a proclamation asking that all stores in the city close and that the citizens of Columbia generally observe the thirty-minute period.

"And what was the cause? Perhaps not one out of ten thousand of our Northern and Western readers would ever guess it. The cause was the funeral services of a negro minister which were to be held at that hour. Nearly four thousand people, many of them whites, crowded the negro church in which the funeral services were held, and hundreds stood outside with bared heads in a drizzling rain. For thirty minutes a solid line passed the bier where the body of this aged minister lay. In attendance at the funeral were the mayor of Columbia; the personal representative of Governor McLeod, who could not be there; Gen. A. W. Clarke, head of the Confederate Camp of the Local Veterans; the editors of the two daily papers of Columbia, and many other prominent citizens. County officials and members of the City Council also attended, and the county Courthouse was closed for the entire afternoon in respect to the memory of this aged negro preacher, 'Uncle Jaggers,' who was born a slave in Chester county, South Carolina, in 1831, and as a youth began to preach the Gospel. At eighteen he was an ordained minister of the African Methodist Episcopal Church. He preached in a mission which he established. He preached to the chain-gang camps on the highways, in the prisons and at the old folks' home, and he fixed his own salary, and the annual amount of it was one cent.

"He was laid to rest amid a mass of floral tributes sent by friends of both races, not only in Columbia and South

Carolina but from many parts of the United States. Among the last words the old man uttered shortly before he ended his earthly journey were: 'I am ready, brother, and I knows I'se got a through ticket to Heaven. Look out for my old folks and teach the young folks the right way to live.'

"This spontaneous tribute of the people of Columbia, men and women of all ages and all classes, whites and blacks alike; the stopping of all business for thirty minutes, the closing of the Courthouse for the afternoon of the funeral, all indicate the spirit of the true white people of the South to the true negroes of that section.

"And this spirit was indicated in Charleston, S. C., a few days ago, when the City Council passed a resolution commending the heroic act of a negro captain of a sailing boat in rescuing people who were in danger. The resolution reads as follows:

" 'Whereas, the people of Charleston have always been prompt to applaud unselfish bravery; and,

" 'Whereas, the action of William Lewis, captain of the Mamie, in risking his own life to rescue eleven of his comrades in the fishing fleet in the squall off Castle Pinckney on Saturday, August 2, was a conspicuous example of the qualities of resourcefulness and courage and sacrifice; now, therefore, be it

" '*Resolved*, That the City Council put on record its appreciation of this gallant fisherman, and it bring his action to notice as one eminently meriting recognition by the Carnegie Hero Commission.'

"Throughout the South there is, on the part of hundreds of thousands of white people, a feeling indicated by the funeral services of 'Uncle Jaggers' at Columbia and the resolution passed by the City Council of Charleston. More and more this spirit will grow as whites and blacks alike come to a closer realization of their responsibility one to the other.

"It has not been surprising to anyone familiar with the situation that, following the teachings of the 'carpet-baggers' who flocked to the South after the Civil War and for years preached to the negroes hatred of the whites, there developed a spirit of hostility. It was white men, 'carpet-baggers' as they were called then, Bolshevists as they would be called today, who, crowding into the South at the close of the Civil War, sought to ride into political power for the purpose of robbing the South by creating hostility on the part of the negroes, which brought forth hostility on the part of the whites, or at least a considerable proportion of them.

"But that generation is passing away. The white people of the South have for years been engaged in hearty co-operative work in the religious activities of the negroes. They are building for them better schools and the negroes are availing themselves of these educational opportunities to the utmost extent possible. What happened in Columbia and in Charleston is suggestive of the spirit which is abroad in the land."

The Central West Largely Developed by Southern People Who Left the South to Get Away From Slavery — In 1860, 924,000 Southern-Born Whites Were Living Outside the South.

One exception should be noted as to the relation between the whites and the blacks prior to the Civil War. The incoming of slaves was largely resented by the non-slaveholding class of whites who did not want to work in competition with slavery. Thousands of them forsook the richer lands of the coast country, moving gradually to the poorer soil of the Piedmont region, where it was less profitable to employ negroes in farm work, passing on from the Piedmont to the mountain sections, and thence across the mountains, following the trails into the West. Many of them, charmed by the beauties of the mountains of the South, or else wearied in the journey, stopped by the wayside and remained in the mountains; others pressed on and largely helped to settle many of the Western states. So great was this movement, due in part to slavery and in part to the Anglo-Saxon spirit of adventure, that in 1860 there were 924,000 Southern-born whites living beyond the borders of the South, and mainly in the Western and far Western states. Many of them felt that they had been driven out of their own land by slavery, and some, like Lincoln, a Southern-born man, and others of his type became the most intense opponents of secession.

In 1860 there were 165,497 Southern-born people living in Illinois, the total number in Illinois, Indiana and Ohio in that year having been 455,683, or nearly 50 per cent of the number of Southern-born people living outside of the South. The majority of these people were from Maryland, Virginia, North Carolina, Tennessee and Kentucky, and these states were largely represented in the 275,825 people born in the central South then living in Missouri.

In broad business ability, in great engineering skill, in material accomplishments, as well as in statecraft, the Old South produced the greatest men that this country has ever had. We very justly boast of what the South has been doing of recent years in material advancement, but with all the progress of the last half-century we are not yet relatively doing as much as was the Old South prior to 1860. And yet Northern writers, often aided and abetted by Southerners who accepted their statements without question and sought Northern applause, made the world believe that the Old South was a land of slothful people, without educational or religious development!

Unfortunately, the Old South, while making history, left to others the writing of it, and after the Civil War there grew up in this section a class of people who, either for the purpose of tickling the vanity of Northern people or because they knew no better, persistently misrepresented the Old South. A charitable construction would put it on the ground of dense ignorance of the real history of the ante-bellum South. Such teachings did infinite harm. They have resulted in creating among the rising generation of the South an impression that this section must look to the North for leaders in material development as well as in educational work. Thousands of young men in the schools and colleges of the South have been made to believe that while the Old South produced great warriors and statesmen, it had no great business leaders, no great scientists, and that all of the development of the last fifty years is something entirely new and foreign to this section. As a matter of fact, some of the best geological reports ever made on the South were written before the war. There is scarcely an important railroad in the entire South today that was not projected prior to 1860. The South of today is merely taking up the work of the Old South so rudely interrupted by the disastrous results of 1861-65 and hampered at the same time by the curse of slavery.

An Inheritance of Initiative, Ability and Industrial Skill From the Men and Women of the Old South

Until we get a proper conception of the Old South we will never have a full appreciation of the inherited traits of character which should make the people of this section the most virile, energetic, broad-minded business men of the world. The South is just beginning to come into its own, but it is still hampered by the false teachings of false leaders who did this section infinite harm by the false training of its own people and the misrepresentation of

its conditions before and since the war. Wherever one travels in the North or West he finds an honest but thorough misunderstanding of the South and the energy of its people.

Some time ago two apparently well-educated women, passing along the main street of a Florida town, saw a number of men engaged in pitching horseshoes, while others stood idly around watching the game. One of these women, turning to the other, said, "You can now see a sample of the laziness of the South and why it has not made greater progress." They did not know that there was not a Southern man in the crowd, and that the men whom they called lazy were Northern and Western men spending the winter in Florida. Among the winter visitors to that state are thousands from the North and West who spend their vacation time in pitching horseshoes, or quoits, and in nearly every community of the state there are one or more favorite spots in which this game is in progress from morning until late afternoon. These two women were thus judging the South by the time spent by Northern and Western visitors in their daily game of horseshoe pitching. They represented, however, a sentiment which largely prevails throughout the country. The complete misunderstanding of the situation by people elsewhere and the charge that the South is non-progressive are on a par with the view of these good women who drew their inference from a mistaken premise, but their mistake is merely indicative of the wide misconception throughout the country of the South and its people.

The World's Greatest Agricultural Invention Was by a Southern Man

The greatest agricultural invention, measured by its influence on the opening up of the West and the extension of wheat growing in this and other countries to feed the world's population, was the McCormick self-binding reaper, invented by a Virginian, the basis of the present McCormick fortune. To McCormick the French Academy of Sciences voted a medal on the ground that he had accomplished more for agriculture than any other living man. Without this invention the settlement of the prairie regions of the West would never have been feasible. Perhaps no invention, except ice making, has ever exerted a wider influence in shaping human affairs, for it made possible an increase in the production of wheat bread in this and other lands to feed the world's ever-growing population with the food so essential to adequate nourishment.

The World's Greatest Business Achievement in 50 Years Between 1800 and 1860 Was by the South

The greatest business achievement in the world during the first sixty years of the Nineteenth Century was the development of the cotton industry of the South, which before 1860 had reached a point where it practically dominated the financial and industrial life not only of this country but of Europe. McCulloh, the English historian, credited to the cotton manufacturing interests of Great Britain—and they were based on the consumption of Southern-grown cotton—the ability of England to restore its financial stability after the Napoleonic wars and to bring about the prosperity which followed.

The development of cotton growing in the South, and the creation of methods for handling and financing it and transporting it to the market, required the investment of more capital than the entire amount invested in 1860 in all the manufacturing interests of the United States at that time. The creation of this business also required a broader business ability and a wider study of international problems affecting trade than did the building up of all the industrial activities of the United States which up to that time were largely devoted to supplying home requirements only and, therefore, did not deal with broad world questions.

During the 45 years from 1870 to 1914, both inclusive, the total value of the exports of raw cotton amounted to $12,804,572,000 and cotton goods to $894,024,000, or a total of $13,698,596,000, while for the same period the excess of our domestic exports over imports, or the balance of trade in our favor, excluding gold and silver exports and imports, amounted to $9,705,099,000. Thus, without cotton, the balance of trade during that period would have been nearly $4,000,000,000 against us. Our cotton exports enabled us to maintain our gold standard. From the fiscal year ending June 30, 1915, to June 30, 1924, the exports of cotton and cotton goods amounted to $8,667,000,000, making a total from 1870 to 1924 of $22,365,000,000. Stupendous as these figures are, it may safely be said that the combined power of Europe's textile and financial interests, often aided by American interests as well, caused the South's cotton crop to sell for at least 50 per cent below its intrinsic value, and which it would have commanded but for this immoral conspiracy to break down prices.

As it was the development of cotton growing in the South which saved England from financial collapse after the Napoleonic wars, so it was to this Southern-grown cotton that the prosperity of New England was due through the growth of its textile and textile-machinery interests. In all the ramifications of New England's business life cotton manufacturing, using Southern cotton as the raw material, and the textile machinery industry in connection therewith, were the great sources of wealth which vivified the entire industrial and general business activities of that section.

"The Pathfinder of the Seas," a World Scientist of All the Ages

Ranking among the foremost scientists that the world has ever known is Matthew F. Maury, a Virginian, who was awarded more medals by European Governments than were ever given to any other American, for his work in charting the ocean currents, measuring the ocean winds and tides, and thus bringing to the world's commerce a new and greater light than it had ever had. Maury's achievements in this respect as the "Pathfinder of the Seas" have for many years been universally recognized as placing him among the foremost of the world's scientists of all ages whose services to mankind can never be fully measured. It was likewise due to Maury's work in laying its foundation that we have the Weather Bureau system of today.

Maury was likewise the ablest advocate which the world had of the building of an isthmian canal. With tireless energy, with broad vision, and with words of burning eloquence, he marshaled the facts to show what the cutting of an isthmian canal, joining the Atlantic and Pacific Oceans, would do for the commerce and industry of the whole world. His arguments and the facts which he arrayed in this constant advocacy of an isthmian canal were the most potent influences in creating such a demand for it as finally to have eventuated in the Panama Canal, the opening of which ten years ago was celebrated last summer. That canal has already demonstrated the wisdom and foresight of Maury and of those who followed in his wake. The whole world is indebted to this Virginian for the work of charting the seas, of showing what an isthmian canal would accomplish for world betterment, and for all the benefits which we receive today from the Weather Bureau.

"Break down the barriers," said Maury, "which separate the Atlantic and the Pacific and the currents of the

world's traffic will be changed and the commerce of the world will center in the Gulf of Mexico."

Ice Making and Refrigeration the Outcome of a Southern Invention

Perhaps no industry of modern times has so vital a relation to the health and welfare of the people of this and other lands as that of refrigeration. It is through the preserving power of ice and refrigeration that we have been able to distribute refrigerated foods from one section to another and from one country to another. Only by means of refrigeration can the meats of the West be sent to all parts of this country and to foreign lands. Only by refrigeration was the development of the meat industry of Argentine and Australia and other lands made possible.

Refrigeration in one form or another enters into the activities of the world and into every phase of living. It is ice which cools the parched brow of the fevered patient. It is ice which preserves the meats and the fruits which we daily consume. It is ice and refrigeration which have made possible the development of the fruit and trucking industry in all parts of the land where vegetables and fruits are shipped from one section to another, enabling the South, for instance, to ship annually an average of over 1000 carloads a day of fruits and vegetables to feed the North and the West during the winter and spring months.

Living today in the full benefit of these conditions, we are unable to comprehend how it would be possible to exist without them, and yet, until Dr. John Gorrie, a native of South Carolina but then living in Florida, brought forth a successful ice-making machine, the world did do without them. His invention was the forerunner of all the ice and refrigeration industry of the world. To this Southern man must be given the credit of an invention perhaps even more far-reaching in its influence upon the food supply of the world than the McCormick reaper. To the South must forever be given the credit of this invention as well as that of McCormick. For years a Southern plant made practically all of the ice machinery produced in this country, having developed the Gorrie ice invention and carried it forward to the development of a large industry.

In Colonial Days and for Years Thereafter the South Led in Industrial Activities—The Pioneers of the South, Says Swank, "Were Born With a Genius for Iron Making."

Up to 1810 the South led the nation in manufacturing interests. From the early colonial days when Virginia mined the first coal ever produced in this country, and when iron interests were established in that state, spreading from there to the Carolinas and Tennessee and Alabama, the spirit of the South was pre-eminently industrial. Washington's father was a miner of iron ore, which he hauled to a neighboring furnace plant owned by local people, and which for years successfully produced pig iron. The men of affairs, the men of high political life like Washington, Jefferson and others in their day, were not only earnest advocates of industrial development, but many of them were actively interested in industrial enterprises.

In his "History of Iron in All Ages," Swank, the world's accepted authority on iron, writes:

"No states in the Union have shown in their early history more intelligent appreciation of the value of an iron industry than North Carolina and Tennessee. The people who built these furnaces and bloomeries were not only bold and enterprising, but they appear to have been born with a genius for ironmaking. They were pioneers and frontiersmen in every sense. From the great world of invention and progress they were shut out by the mountains and streams and hundreds of miles of undisturbed forest." And he adds:

"The daring men who pushed their way into the wilds of western Carolina and eastern Tennessee in the last century, and who set up their small furnaces and bloomeries when forts yet took the place of hamlets, founded an iron industry which [at the time he was writing in the last century] still retained many of the primitive features that at first characterized it."

In many cases these pioneer iron men were the leading citizens of the Colonies. In 1716 Governor Spotswood of Virginia established several iron-working enterprises, and in 1727 the General Assembly of that state passed an act "encouraging adventures in iron works." Col. William Byrd of Westover, Va., writing in 1732 of the many iron enterprises that had been started, gives some particulars of a number of them, including "England's iron mines, called so from the chief manager of them, though the land belongs to Mr. Washington." These mines were on the north side of the Rappahannock River, twelve miles from Fredericksburg. Two miles distant was the furnace to which, according to Swank, Mr. Washington, the father of George Washington, "hauled the ore, receiving therefor twenty shillings the ton of iron that it produced."

About 1790 the iron industry of Virginia took a fresh start, as did many other manufactures of the state. This activity continued for many years, but it was partly checked in subsequent years by the greater attention given to agricultural pursuits. "No state in the Union," said Mr. Swank, "gave more attention to domestic manufactures after the close of the Revolution than Virginia. Richmond, Lynchburg, Staunton, Winchester and some other places became noted for the extent and variety of their manufactures. Household manufactures were also everywhere cultivated. The manufacture of nails was one of these industries. Thomas Jefferson required about a dozen of the younger slaves owned by him to make nails."

In South Carolina iron works were built as early as 1773. At the beginning of the Revolution the state offered liberal premiums to those who would establish iron works, and in York and adjoining counties a number of furnaces and rolling mills and nail mills were established.

The late Col. John L. Black, a West Point graduate, a son of one of the pioneer ironmakers of South Carolina, in a letter to me some years ago, writing of the early days of iron manufacturing in North Carolina and upper South Carolina, said:

"Small quantities of iron were made in Catalan forges along the Piedmont slope in the Carolinas prior to and during the Revolutionary War. A Catalan forge was operated at the falls of the Reedy River on the very spot where the Camperdown Cotton Mill now stands, in the center of the city of Greenville, during the Revolutionary War. Tradition says that gun barrels were forged on the spot from this iron.

"During the Revolutionary War, William Hill, the father of the late Gen. D. H. Hill of the Confederate Army, operated a forge and a small blast furnace on Allison Creek, at the foot of Nannie's Mountain, and made iron from these very pure ores. Lord Cornwallis in his advance from upper South Carolina to Charlotte, N. C., burnt Hill's works and destroyed some small iron guns Mr. Hill had cast to aid in the colonial rebellion.

"A small blast furnace was erected on King's Creek, seven miles southwest of Blacksburg, about 1822; also a Catalan forge. In 1824 Stroup left King's Creek and moved seven miles to the present site of the Cherokee Cotton Factory, and began to build iron works on Broad

River. In 1826 E. Graham & Co., all of Columbia, S. C., and David Johnson bought the Stroup interest and proceeded to build iron works. E. Graham & Co.'s interests were merged into an incorporated company, the King's Mountain Iron Co., with $100,000 capital, a portion of which was invested in slaves as operatives and mechanics.

"In 1827 the King's Mountain Iron Co. erected a blast furnace. This was replaced by a larger furnace on the same site in 1837. In 1832 E. Graham & Co. built a rolling mill in Union county, two miles below their furnace. In 1830 they cast guns—six and nine pounders—for the state of South Carolina, and quantities of round shot; also grape and canister. In 1837 the King's Mountain Iron Co. built a second blast furnace. In the same year the Magnetic Iron Co., capital $250,000, of which 60 per cent was invested in slaves, was incorporated and built at Cherokee ford, on Broad River, one mile above the site of the King's Mountain Iron Works, and near the present town of Blacksburg, four furnaces, a rolling mill, nail factory, etc. This company graded and operated a tramway five miles long to bring in ores, limestone, charcoal and supplies.

"About 1837 a furnace was erected by the South Carolina Manufacturing Co. near the old Cowpens battleground, in Spartanburg county. This company also built and operated a mill to roll iron, and a nail factory at Hurricane Shoals, on Pacolet River, now the site of the Clifton Cotton Mills. During the late Civil War the works spoken of above were operated to their utmost capacity, casting bolts, shot and shell. No large guns were cast, as it was then 20 miles to the nearest railroad point, Yorkville, S. C. At the close of the war the emancipation of the slaves, and Confederate securities in which they had largely invested, bankrupted all the companies. The supply of charcoal was exhausted and the works stopped."

The Forerunner of the Sleeping Car

Colonel Black often claimed that his father, owning a number of furnaces in Blacksburg, though he lived in Greenville, was the forerunner of the work of Mr. George M. Pullman, inventor of the Pullman car, by reason of the fact that he had a long carriage built in which there was a bed. In order not to waste daylight hours while traveling, he would go to bed in his carriage at Greenville and be driven all night that he might reach Blacksburg without the loss of daytime and return by night. Before the days of railroad transportation, desiring to establish some new line of iron working in his plant, Mr. Black rode horseback from South Carolina to Pittsburgh, secured a couple of Welsh iron workers and took them back on horseback and installed them in his plant.

The facts presented in Colonel Black's letter are but typical of conditions that prevailed in early days in Virginia, the Carolinas, Georgia and Tennessee. It is from the pioneer industrialists of those days that many people of the South of today have inherited their technical trend of thought and their managerial ability. In this fact is found an asset of the South whose value can never be measured. It is likewise an asset of equal value to the nation.

The Curse of Slavery and of Cotton Fastened on the South by the Invention of the Cotton Gin

Why was it, under these circumstances, that the South became so largely an agricultural region, turning its attention from industrial pursuits to the growing of cotton, rice and sugar, especially cotton? The answer is found in the invention of the cotton gin, which brought about an increase in slavery and in concentration of thought upon agriculture and a turning away from protective-tariff views to free trade, hoping thereby to sell its cotton abroad and to buy in the world's cheapest markets even to the destruction of the growing manufacturing interests of its own people as well as those of the North.

When Eli Whitney, a native of New England living in the South, perfected the cotton saw gin, which had been the thought of a Georgian, Hodgen Holmes by name, he brought about a change which fastened slavery upon the South through the ginning of cotton by machinery instead of by the old hand method of picking the seed from the staple. The world was hungry for cotton. This invention made possible the development of the cotton industry to meet the world's insatiate demands. Prices ruled as high at times as 44c a pound.

In 1790 the South raised 4000 bales of cotton. In 1795 the saw gin was perfected, and the next year's yield of cotton was 20,000 bales. By 1800 the crop had advanced to 80,000 bales, by 1810 to 160,000 bales, and by 1820 to more than 300,000 bales. From the crop of over 300,000 bales in 1820 production rapidly increased. Profits were large, and the energy and the capital of the South were turned into cotton raising, causing a halting in industrial pursuits, for wherever any one industry offers the largest profit for capital there it will be concentrated.

With prices ranging from 44 to 13 cents, and averaging for 40 years, from 1800 to 1839, a fraction over 17 cents a pound, cotton cultivation was extremely profitable. Beginning with 1840, there came a period of extremely low prices and the cotton growers suffered heavily. In that year the average of New York prices dropped to 9 cents. This was followed by a continuous decline until 1844-45, when the New York average was 5.63 cents. Moreover, in 1846 the seed not needed for planting was of little value and was sometime dumped into the rivers as a waste. In 1847 the crop was short and the prices advanced sharply, only to drop back in the succeeding years to 8 cents as the New York average, and then to 7¼ cents, making the average from 1840 to 1849 the lowest ever known in the cotton trade for a full decade.

With the decline in the profit of cotton growing the thought of the people of the South turned once again to industrial pursuits, and many conventions were held to revive the South's industry in manufactures, and to stimulate railroad building and the establishment of steamship lines to Europe. This agitation had a marked effect, and between 1850 and 1860 there was a very rapid advance in manufacturing and railroad enterprises.

Leadership in Ocean and Land Transportation Belongs to the South — The First Railroads Built in America Were in the South—The First Steamship to Cross the Atlantic Was Owned in the South.

No people more quickly appreciated what the discovery of steam for transportation meant to the world than Southerners. Alive as they were to foreign trade by reason of finding a market in Europe for nearly all of their cotton, they quickly grasped the situation and led the nation in this respect.

The first steamship which crossed the Atlantic was owned by Savannah men and sailed from that port for Liverpool. It was appropriate that steam navigation across the Atlantic should have been first started by the South, for James Rumsey, a native of Maryland, made upon the Potomac River the first application of steam to the propulsion of a boat.

The two first railroads built in this country were in the South, and the first hundred-mile railroad ever built in the world was in the South.

The first locomotive built in this country was built for

a South Carolina road, and was named "The Best Friend," suggestive of a realization by the people of that day that the railroad marked a new era in human affairs by bringing about enlarged transportation facilities and closer contact between the people of all sections of the world. The fireman of that locomotive was a negro. Disturbed by the noise of the escaping steam when one day he wanted to sleep, he tied down the safety valve. There was soon an explosion which very nearly wrecked the locomotive, but whether it destroyed the negro fireman or not history does not record so far as the writer knows. This engine was rebuilt and again made to do its appointed work. Some years later the negro race, not by its own volition, sat on the safety valve of civilization, bringing forth the the explosion between 1861 and 1865, which more completely wrecked the South than was "The Best Friend" wrecked by its explosion.

The spirit of the people of those days found expression in many industrial and commercial conventions held in various parts of the South to stimulate a larger interest in material progress to which reference has been made. A convention of Southern and Western merchants was held in Augusta, Ga., in 1838 which recommended the speedy adoption of measures for the introduction of commercial education among the youth, so that there might be established "a body of merchants whose entire interest and feeling would be centered in the country which had reared and sustained them." Probably the first plan for a professorship of commerce in this country was drawn up by James D. B. DeBow for the University of Louisiana under an endowment by Col. Maunsel White. In this plan he designated the chair as a "professorship of public economy, commerce and statistics," and included in it "the application of statistics to commerce, agriculture and manufactures."

DeBow was the publisher of the DeBow Review, which for many years before the Civil War was probably the foremost industrial and commercial publication in this country. It was doing for the South exactly the same kind of work that the MANUFACTURERS RECORD has been seeking to do for the last forty years, but as I contrast the opportunities of the present with the limited facilities of DeBow's time I am compelled to admit that his publication was far and away ahead, for its day, of the work of any financial and industrial publication of the present day.

A Charleston commercial convention of 1854 urged Congress to encourage the establishment of mail steamers between Southern ports, Brazil and Europe, and also for the improvement of the merchant service by encouraging boys to go to sea, and recommended that "the Southern states lend their aid by exempting from taxes for a limited time the goods directly imported into them, or by allowing the importers an equivalent drawback or bounty." This move for a subsidy or bounty for steamship lines indicates how clearly the Southern leaders of that period recognized the importance of an American merchant marine and were not afraid to advocate bounties or subsidies.

THE FEARFUL LOSSES OF THE WAR AND RECONSTRUCTION AND EMIGRATION UNWISELY ENCOURAGED BY RAILROADS CAUSED FIVE MILLION SOUTHERN-BORN WHITES TO EMIGRATE FROM THE CENTRAL SOUTH.

Suggestive as are the foregoing facts and figures, their full weight can be felt only in contrasting conditions of today with those that confronted the men of the South forty to fifty years ago.

Of late years a fair measure of credit is being given to the mental and physical ability of the men who planned and for four years fought the almost ceaseless battles of 1861 to 1865. But the full measure of this titanic struggle has never been quite grasped by the world. With only 6,900,000 white people and 4,000,000 slaves scattered over a vast territory from Virginia to Texas, without any preparation whatever on land or on sea for war, without an army or a navy, with a new government that had no credit abroad and no means at home on which to base a financial system, with domestic trade practically destroyed, without foreign commerce, its coast blockaded from end to end, without means to utilize cotton—its chief source of wealth—for four years the South met on the battlefield the greatest armies which the modern world had seen. Against the South's 6,900,000 whites the Union had over 20,000,000 on which to draw for its armies and their equipment. Its ports were open to the world, it had an established government, an army and a navy, and its territory was really never invaded except during Lee's march to Gettysburg.

From Virginia to Texas the South's "far-flung battle line" had to meet a force vastly superior in numbers, in equipment and in commissary supplies. Only when viewed in some such light as this do we begin to get an idea of that supreme test of character and strength and the physical and mental stamina which for four years enabled the South to meet such overwhelming odds. Coming out of that struggle bankrupt, weary in body and mind, the men who were left took up that equally heroic struggle of redeeming the South from the thraldom of poverty and Reconstruction, which should be called "Destruction."

Material losses had been terrific. The census of 1860 showed that the South ranked very high in wealth as compared with the rest of the country. In that year the assessed value of property in Georgia was greater than the combined values of Maine, New Hampshire, Vermont and Rhode Island. South Carolina was richer by $68,000,000 than Rhode Island and New Jersey. Mississippi outranked Connecticut by $160,000,000.

In the assessed value of property per capita, Connecticut stood first in rank; Rhode Island, second; South Carolina, third; Mississippi, fourth; Massachusetts, fifth; Louisiana, sixth; Georgia, seventh; District of Columbia, eighth; Florida, ninth; Kentucky, tenth; Alabama, eleventh; Texas, twelfth; New Jersey, thirteenth; Maryland, fourteenth; Arkansas, fifteenth; Virginia, sixteenth; and Ohio, seventeenth. New York and Pennsylvania were also far behind the South in the amount of wealth in proportion to population, the former state ranking twenty-second and the latter thirtieth.

In 1860 the true value of property in the United States was $16,159,000,000, and of this the South had $6,332,000,000, or nearly 40 per cent.

In ten years there was a startling change. In 1870 the South had only $4,400,000,000 of true value, while the total for the whole country was $30,068,000,000. The South had grown poor; the North and West rich as never before.

In 1860 the assessed value of property in Massachusetts was $777,150,000, compared with $5,200,000,000 in the South; in 1870 Massachusetts had $1,590,000,000 of taxable property and the South $3,000,000,000. Such was the poverty of the South that the one state of Massachusetts had one-half as much taxable wealth as the fourteen states of this section could show.

South Carolina, which in 1860 had been third in rank in wealth in proportion to the number of its inhabitants, had dropped to be the thirtieth; Georgia had dropped from seventh to thirty-ninth; Mississippi, from fourth place to the thirty-fourth; Alabama, from the eleventh to the forty-fourth; Kentucky, from tenth to twenty-eighth; and the

other states had gone down in the same way, while the Northern and Western states had steadily increased in wealth.

In 1860 the assesed value of property in South Carolina, according to the census, was $489,000,000, while the combined values in Rhode Island and New Jersey aggregated $421,000,000, or $68,000,000 less than South Carolina's. In 1870 the combined values in Rhode Island and New Jersey amounted to $868,000,000, and the value in South Carolina was $183,000,000. Thus, while South Carolina in 1860 had $68,000,000 more assessed property than these two states, their wealth in 1870 exceeded South Carolina's by $685,000,000.

The census reports bring out very clearly the South's relative position of wealth. Comparing the true valuation as given by the census (the true valuation always being greater than the assessed valuation) of real and personal property, we have:

TRUE VALUES BY SECTIONS, 1850-1880

Sections	1880	1870	1860	1850
New England and Middle states	$17,669,000,000	$15,290,032,687	$5,591,607,424	$3,130,989,851
Southern states	7,505,000,000	4,401,462,507	6,332,456,289	2,846,956,892
Western states	16,186,000,000	9,542,053,355	3,966,735,753	1,126,447,585
Pacific Coast states and Territories	2,282,000,000	834,969,958	268,816,602	33,385,900
Total for United States	$43,642,000,000	$30,068,518,507	$16,159,616,068	$7,137,780,228

As shown by these figures, the South (Missouri being classed in all of these comparisons as a Western state) had in 1860 nearly 40 per cent of the true value of all real and personal property in the United States, outranking the Middle and New England states combined by nearly $741,000,000, whereas in 1850 the latter sections had outranked the South by $284,000,000.

The value of Southern property increased during the decade 1850 to 1860 by over $3,485,000,000, against an increase of $2,460,000,000 in New England and the Middle states. That decade witnessed a marvelous advance in Southern agricultural, manufacturing and railroad interests, the extent of which can be appreciated by this increase of largely more than 100 per cent in property values. The average valuation of property per capita in the South in 1860, even including slaves in the total number of inhabitants, was $568, against $528 in the New England and Middle states. Omitting the slaves from the number of inhabitants, the per capita of wealth was almost twice as great in the South as in the New England and Middle states.

When we turn from the progress and prosperity of 1860 to the poverty of 1870 the task of the saving remnant of the South can be more fully realized. In ten years the true value of Southern property had declined by nearly $2,000,000,000.

In the rest of the country the value of property increased from $9,827,000,000 in 1860 to $25,667,000,000 in 1870, or by $15,840,000,000.

In the twenty-year period from 1860 to 1880 the South gained in true value only $1,172,000,000, and that was largely in Texas, while the gain in the rest of the country was over $26,310,000,000.

Far greater than the money loss by the war, thus indicated, was the loss of men—men who had been leaders in thought and in action. That was enough to stagger a country. Through death and invalidism the South had lost several hundred thousand of its most virile men. But the condition which prevailed as a result of the war and of Reconstruction, the lack of opportunity and the almost hopeless despair for the future on the part of many, coupled with the unwise but tremendous efforts of Southern railroads to induce the people to move West or to Texas for the beggarly profit to their passenger departments, forced out of the South between 1865 and 1910 5,000,000 of its white people. Today there are living in other sections about 2,000,000 Southern-born whites. Among them are leaders in every line of human endeavor. They are dominant forces in New York and other Northern cities, in the West and the far Northwest and on the Pacific Coast. Though other sections were growing in population and in wealth, though they were receiving vast immigration movements from abroad, the South was giving its very life-blood to add to their strength and power and receiving almost nothing in return. Few people seem ever to have realized the tremendous influence of this condition for retarding Southern development and its equally tremendous influence for helping to upbuild other sections.

Under such difficulties it was impossible for the South to rally immediately from the wreck of the war. Everything was against it. The Federal Government had voted many millions of acres of Western land to railroad builders, who realized that this land was valueless unless settlers could be had for it. As these railroads were financially backed by the banking powers of the East and of Europe, here was a combination of all the great financial forces of the United States, of England and the Continent for the purpose of turning population from the South and the East to the West, and for bringing immigrants by the millions from all parts of Europe on through tickets from their European homes to the point selected in the West.

Perhaps the most astonishing phase of this entire movement was the hearty co-operation given by some Southern railroads to the movement of population from the South to the West. The entire South was flooded by the passenger departments of many Southern railroads with literature telling of the glories and the opportunities of the West. Passenger agents of Southern railroads worked up excursions carrying hundreds of people at a time from the South to the West merely for the beggarly pittance received in payment for tickets sold at low rates. I know of nothing in the history of this country which from the economic point of view was so thoroughly unwise and unjustified. These railroads were draining the very territory upon which their entire future was staked, using every influence which they could command to discourage Southern people remaining at home, and encouraging them to avail themselves of cheap rates to the West. Conditions in the South were bad enough to drive many people out of this section even if there had been no active work on the part of Southern railroads to induce them to move away. The 5,000,000 Southern-born whites that left the central South from Maryland to Louisiana between 1865 and 1919 constituted the greatest economic drain which any country has had to face in modern times.

THE SOUTH SAVED THE NATION BY SAVING ITSELF

By ceaseless work of the combined financial and railroad influences of the world and the moral sentiment against slavery, the public sentiment of the world had been largely educated to believe that the South was not a fit country for settlers or for the investment of capital.

But it had its saving remnant of men and women who knew not how to accept defeat. They saved the South to white civilization. They solved problems such as no other race on earth had ever faced. They gave to the world the final answer as to the stuff of which the people of the Old South were made. It is to them that we should give credit for what has been accomplished. They are the ones who blazed the pathway out of the wilderness. They relit the furnace fires of Alabama and Virginia and Tennessee and Kentucky. They commenced the rebuilding of the South's cotton mills and the diversification of Southern agriculture. All that we are doing today is scarcely one-tenth as difficult as was the work which they wrought.

In saving the South to Anglo-Saxon civilization these Southern people literally saved the nation, for if the vast territory of the South, comprising nearly one-third of the country's area and having three-fifths of its coast line, had been permitted to sink into the barbarism of Santo Domingo and Haiti, as some of the South's haters hoped to bring about, the nation itself would have been well-nigh, if not quite, lost.

The Commercial Spirit of the Old South as Shown in Many Conventions and Their Activities

Mere mention of the material losses of the South reflected in the figures of the period between 1860 and 1880 points to an advanced position of that section in 1860 not fully comprehended even by some Southerners of today. Knowledge of definite accomplishments bringing it to that position is the beginning of an understanding of the spirit of the Old South that was able to survive the wreck of war and the slow wasting of the subsequent decade and to revive the industrial spirit bringing forth the activities of the last 50 years.

"The New South," a term which is so popular with many people, is supposed to represent a country of different ideas and different business methods from those which prevailed in ante-bellum days. The origin of the term has been a subject of much discussion, but I have rarely seen it ascribed to what I believe to have been the first use of it. During the war, when Port Royal, S. C., was occupied by Northern forces, a paper called The New South was established by some of the officers. This was probably the first time that the term was applied to the Southern states. Its use now, as intended to convey the meaning that the progress of the South of late years is something entirely new and foreign to this section, something which has been brought about by an infusion of outside energy and money, is wholly unjust to the South of the past and present. It is an improper use of the term, or, rather, an abuse of it. There is a new South—a South which is making a vigorous effort to regain the relative position held in 1860 as compared with the whole country, a South which has met and solved many of the hardest problems ever faced by any people in the world; but without the Old South the New South would have been an impossibility. The South of today is no novel creation. It is a rebirth of the Old South.

It needs but little investigation to show that prior to the Civil War the South was fully abreast of the times in all business interests, and that the wonderful industrial growth which it has made since 1880 has been due mainly to Southern men and Southern money. The South heartily welcomes the investment of outside capital and the coming of all good people, regardless of their political predilections, but it insists that it shall receive from the world the measure of credit to which it is entitled for the accomplishments of its own people. It justly points to the Old South and its work as proof of the broad business ability and energy which found new expression in the revival of activity after 1876.

In the Old South were bold railroad builders, aggressive for an expansion of foreign commerce, far-seeing nationalists in statesmanship, practical and unselfish promoters of their country's greatness and profoundly successful in education. In finance and banking the Old South had no superior in any other section. In 1860 it had 30 per cent of the banking capital of the entire country. Louisiana ranked as the fourth state in the Union in the amount of banking capital in that year, with New York first, Massachusetts second and Pennsylvania third. Louisiana banks were second in the country in specie holdings in 1860, New York alone being ahead.

Nearly a century ago the South had reached the point where it was a constantly-increasing contributor to America's foreign commerce, which was at that time so greatly enriching other parts of our country. Earnest men like Stephen Elliott of South Carolina were projecting steam railroad lines connecting the Southern seaboard cities with what was then the undeveloped West, and two or three conventions were held in the cotton states for the purpose of arousing an interest in other lines than agriculture dominated by cotton growing. By 1845 conventions designed to build up industry and commerce began to meet more frequently, and in the fifties they were held every year.

At the Memphis convention of 1845, over which John C. Calhoun presided, resolutions were adopted in favor of the improvement of the navigation of the Ohio and Mississippi Rivers as objects strictly national, of connecting the Mississippi River with the Northern Lakes by a ship canal, of the prompt extension by the Government of the telegraph into or through the valley of the Mississippi, of aid by Congress by grants of land for the construction of railroads projected through the public domain, and of a dry-dock for repairs and refitting of Government vessels at some suitable point on the Gulf of Mexico. The convention took the ground that the railroads and other means of communication between the Mississippi Valley and the South Atlantic ports would give "greater facilities to trade, greater dispatch in traveling and in developing new sources of wealth," and would have a salutary influence, commercial, social and political.

The Memphis convention of 1853 regarded the establishment of direct communication by steam between Southern ports and Europe, and the encouragement and protection of this system by the National Government, connecting therewith ample mail facilities, as an essential feature in the commercial independence of the South and West.

The Charleston convention of 1854 urged Congress to encourage the establishment of mail steamers between Southern ports, Brazil and Europe, and also for the improvement of the merchant service by encouraging boys to go to sea, and recommended that the Southern states lend their aid by exempting from taxes for a limited time the goods directly imported into them, or by allowing the importers an equivalent drawback or bounty.

It was probably due to the effect of these conventions and to the general discussions following their work that the Legislature of Louisiana passed an act granting a bonus of $5 a ton for every vessel of more than 100 tons burden which should be built in the state within five years and $4 per ton on every steamer.

At Charleston in 1851 the stock necessary for the organization of the Atlantic Steam Navigation Company was promptly subscribed.

At that time the Southern states were most liberal in their aid to railroad building with a view of developing trade. A notable example of the general tendency was apparent in the message of Governor Manning of South

Carolina to the legislature of 1852-53, recommending a subscription by the state of $1,000,000 to the Blue Ridge road projected from Anderson to Cincinnati, on the ground that this would secure for Charleston a gigantic foreign commerce.

Prominent in all these movements, either as a personal participant or as a vigorous writer, was DeBow, who has been mentioned previously. His speeches were many, but in none of them was a more stirring sentence than in his address at Nashville in 1851, when, speaking for railroad their sentiment. Referring to railroads, it said:

"God may have given you coal and iron sufficient to work the spindles and navies of the world, but they will sleep in your everlasting hills until the trumpet of Gabriel shall sound unless you can do something better than build turnpikes."

Stimulated by such leaders as DeBow and others, railroad building was gradually pushed, with lines reaching from the seaboard towards the interior, others connecting interior towns, the prevailing idea being to establish systems connecting Southern ports with the productive inland markets in order to enlarge both the export and import movement through Southern ports.

Existing Southern Railroads Projected and Aggressively Urged Before 1860

An address calling for a railroad convention of Southern and Western states to meet at New Orleans in 1852 is a splendid summary of the spirit prevailing among the progressive men of that day. A few extracts will indicate their sentiment. Referring to railroads it said:

"Is there any necessary reason that the whole commercial strength of the nation should concentrate in the cities of the North, whilst New Orleans, Mobile, Charleston and Savannah are arrested in their progress, or exhibit at times even the evidences of decay?"

"Whilst we have been idle spectators, New York and Boston have been taking away the commerce of the rich and growing states of the Northwest, which once paid tribute to us as it passed to the ocean but which now avoids our limits and refuses its former wealth. Are the millions of the Northwest more naturally allied to those of the North than to us, who occupy a part of the same great valley and are nearer of approach, and must we forever abandon the idea of controlling or of sharing their commerce?"

"What then must be done for New Orleans? She must, by a wise and liberal stroke of policy, regain a part, if not the whole, of the trade she has supinely lost and open new sources of opulence and power, which are abundant all around her. She can do this by changing and modifying her laws bearing unequally or hardly upon capital and enterprise, by cheapening her system of government, by affording greater facilities and presenting less restrictions to commerce, by establishing manufactures, opening new steamship lines to Europe and conducting a foreign import trade, and finally, and what is of first importance and should precede every other effort, by munificent appropriations to railroads branching to the West and to the North and the East from a terminus at her center or from termini on such interior streams and rivers which are necessarily tributary to her. Now is the accepted time for action. Tomorrow will be too late."

The wide grasp of the situation is further demonstrated by the recommendation of the convention that there be constructed "the Southwestern National Railroad from Washington city to New Orleans, passing through the states of Virginia, Tennessee, Alabama, Mississippi and Louisiana, constituting the shortest practicable line of mail and travel transit, and consisting of the following continuous sections now under construction, to wit: the Richmond & Lynchburg Railroad, the Virginia & Tennessee road, the Alabama & Tennessee River road, the Selma & Jackson road, the New Orleans & Jackson road," and that "a railway and water communication across the Isthmus of Tehuantepec is of national importance, especially so to the whole Southwest."

Underlying many of the plans of that day was the conviction that the future of the South in this direction was assured by the fact that cotton and its manufactures had given the great impulse to commerce in the early part of the century, and there is quite a familiar sound in the statement made in the report of the Legislature of Alabama about 1838, that it cost Alabama $1,800,000 to get its cotton to European markets and another $1.800,000 to get to Alabama the imports in exchange, and the question was asked, "If this amount must be paid, why should it not be paid to our own citizens?"

In the report made by Robert Y. Hayne at one of the earliest Southern commercial conventions at Charleston in 1839 it was stated that while the Southern and Southwestern states were producing nearly three-quarters of the domestic exports of the Union, they imported scarcely one-tenth of the merchandise received in exchange, and that foreign commerce was causing cities of other states to flourish while Southern cities were falling into decay.

Seeking to Encourage Shipping From Southern Ports—Industrial Development

Bearing particularly upon the relation of cotton manufacturing to commercial expansion were portions of a pamphlet published originally in a series of communications to the Charleston Courier in 1845. Its author, William Gregg, was a pioneer in cotton-mill building in South Carolina, and his pamphlet, based upon experience, observation and judgment, was an argument for the support of industrial and shipping undertakings. Taking Newburyport, Mass., as an illustration of the benefit of industrial interests and shipping facilities in overcoming a threatened decay of the town, he said:

"The wharves are now crowded with shipping, the sound of the hammer is heard in every direction, new houses are being erected and old ones have been remodeled, real estate has not only advanced to its original value but doubled and quadrupled it, and so it would be with Charleston, Augusta, Columbia and other places in the South."

Suggesting that the spinning of cotton yarn might be profitably undertaken by the South, he said:

"And there is no good reason why the name of some of our large planters should not be seen on bales of yarn making their way to Europe to supply the markets that are now monopolized by the English spinners. England has for many years been sending millions of dollars' worth of this article to the Continent. Since 1832 she has exported to that part of the world from $16,000,000 to $25,000,000 worth per annum. And what is to prevent us in Carolina from setting up a claim to a portion of this trade? Are we afraid of Northern competition in this the simplest of all kinds of manufacture? The South has never failed to supplant the North in this branch of manufactures wherever the attempt has been made. As we begin to have some practical experience in manufacturing in the South, we can now see what an absurdity it would be for us to pack up our cotton and send it to England to be returned as osnaburgs, taxed from $60 to $80 per bale, as was the case formerly, when the same can be converted into cloth in the immediate neighborhood

of the place in which it grew for one-fourth of the sum. It is equally as absurd in us to send our raw cotton to Europe to be spun into yarn, adding $40 to $50 to the value of a bale, which yields the planter of the interior, after paying the expense of transportation, from $12 to $15 only."

In 1852 J. G. Gamble, in a letter urging the erection in every county in the cotton states of factories to commence with spinning, and afterwards to enter upon the weaving of cloth, wrote:

"Our Southern factories would obtain the raw material at least 20 per cent cheaper than those of England, and Southern yarn and cloth would monopolize both the foreign and the home market. Let each county commence with a factory of 1000 spindles, and let the planters agree to invest annually 10 per cent of their crops in the extension of such factories, and in a few years they would manufacture the whole crop of the country and export it in the shape of yarn and cloth. Such a course would double the value of our exports, and would add to the prosperity of the country more than the gold mines of California twice told. Its effect upon the banking institutions and commercial interests of the country cannot be sufficiently estimated."

Again, the contention was made that a given number of spindles could be put in operation in Georgia for much less cost than a like number could be put in operation in any of the Northern states, because of the difference in the value of land, water-power and buildings, and that they could be kept in operation for much less because of the difference in the price of labor, provisions, clothing and fuel, and that this advantage would necessarily give the state a leadership in the markets of the world, so that ultimately these factories would supply not only the local demand but that of foreign markets. And he expected the commerce of India and China to reach the Atlantic through Georgia. He had in mind transportation across the country, and urged Georgia to diversify both its crops and its manufacture so as to make the profit of transportation and retransportation.

At that time public opinion was divided between a railroad from the Mississippi to the Pacific, which was to be built for the full development of the territory of the United States, and the route across the Isthmus either by rail or water. It is interesting to note in this connection T. Butler King's report on the proposed Panama railroad, in which he furnished a comparison of the routes to the Pacific ports by way of Cape Horn and the Isthmus of Panama from Liverpool to New York, and pointed out as one of the great causes of British commercial supremacy that "she not only has the ports of the Continent of Europe as her neighbors, but she is 1500 miles, or two weeks, nearer than we are to all the other ports of the world, except the Atlantic ports of the American continent north of the equator and of the West Indies." This report was quoted in an argument in favor of a railroad or canal across the Isthmus. Of special importance in connection with this suggestion was mentioned the lessening of the distance to the Asiatic, Polynesian and other Pacific markets. The figures of population of the Sandwich Islands, Sumatra, Borneo, India, the Philippines and China were given, and the question was asked:

"Can it be imagined that these vast regions, so densely populated, have already reached the acme of their foreign trade, or is it not plausible, when better systems of intercourse are opened, jealousies removed and civilization extended, that trade with them will be augmented two or threefold, reaching, perhaps, in the aggregate $5,000,000 to $8,000,000? Instead of 200 travelers visiting the East per annum, in such a contingency would not the number reach nearer 20,000, which, at half the present rates of travel, would realize $6,000,000 or $8,000,000?"

These figures seemed large in that day, but in comparison with what is already being done in the development of trade with the Orient they are insignificant. They do, however, show that the spirit which prevails today of determination on the part of the cotton manufacturers and business men generally of the South to take and hold a dominating position in the development of Oriental trade is but a revival of the spirit of the Old South.

In the Memphis convention of 1849 the construction of a national railroad from the Mississippi to the Pacific Ocean, and also the construction of branch roads connecting the main trunk line with the Northern Lakes, the Mississippi River and the Gulf of Mexico, were advocated. The convention also favored the construction of a railroad across the Isthmus to facilitate trade while the national road was under way.

About 1837 a strong effort was made to obtain from the Virginia Legislature a charter for the Atlantic Steam Navigation Company. The promoters proposed to make Norfolk the terminus of the line, provided the South should take a part of the stock. Maury was acquainted with it and realized its potentialities. Discussing it 10 or 15 years later, he wrote:

"Had the Legislature of Virginia granted that ocean steam navigation charter Norfolk would at this day have been the center of steamship enterprise for the United States.

"The French steamers would have been built there; they would have been commanded and controlled by Americans.

"This would have established foundries, machine shops and shipyards at Norfolk, and have placed her 10 or 15 years ahead of New York in the steamship business. Norfolk would have been enabled to get the contracts from the Government for establishing those lines of splendid steamers that are now giving such a tremendous impetus to the trade, business, travel and traffic of New York. The lines of the Isthmus would have belonged to Norfolk. Hers would probably have been the Havre and Bremen lines, and the Old Dominion might have claimed also what is now the Collins Line."

Maury's Glowing Picture of What an Isthmian Canal Would Accomplish

Commodore Maury then told the reasons for the shifting of direct trade from Southern ports to New York as improvements in navigation were made, but expressed the hope that before 1857 he would see the Isthmus pierced with commercial thoroughfares, great national highways across America and the South, regaining in tenfold measure its foreign commerce, its direct trade, its importing business and commercial prosperity. In discussing this he said:

"From the Gulf of Mexico all the great commercial markets of the world are downhill. A vessel bound from the Gulf to Europe places herself in the current of the Gulf Stream and drifts along with it at the rate, for part of the way, of 80 or 100 miles a day. If her destination be Rio, or India, or California, her course is the same as far north as the Island of Bermuda.

"And when there shall be established a commercial thoroughfare across the Isthmus, the trade winds of the Pacific will place China, India and all the islands of that ocean downhill also from this sea of ours. In that case the whole of Europe must pass by our very doors on the great highway to the markets both of the East and West Indies."

Again and again he reverted to the part to be played

by the South in the expansion of American trade through the union of the Atlantic and Pacific, and one of his most comprehensive papers was devoted to a survey of the possibilities of the Gulf of Mexico and the Caribbean Sea, which he called the Mediterranean of the West, to be developed by the isthmian connection. In a most graphic manner he sketched the tremendous importance of the valleys of the Mississippi and the Amazon as contributors to the commerce of the Gulf; he showed that the energies of the United States were so great that they required a highway across the Isthmus to give them full scope and play, and in conclusion said:

"From all this we are led to the conclusion that the time is rapidly approaching, if it has not already arrived, when the Atlantic and Pacific must join hands across the Isthmus. We have shown that there is no sea in the world which is possessed of such importance as this Southern sea of ours; that, with its succession of harvests, there is from some one or other of its river basins a crop always on the way to market; that it has for back country a continent at the north and another at the south, and a world both to the east and the west. We have shown how it is contiguous to the two first and convenient to them all. The three great outlets of commerce, the delta of the Mississippi, the mouths of the Hudson and the Amazon, are all within 2000 miles, ten days' sail, of Darien. It is a barrier that separates us from the markets of 600,000,000 people—three-fourths of the population of the earth. Break it down, therefore, and this country is placed midway between Europe and Asia; this sea becomes the center of the world and the focus of the world's commerce. This is a highway that will give vent to commerce, scope to energy and range to enterprise, which in a few years hence will make gay with steam and canvas parts of the ocean that are now unfrequented and almost unknown. Old channels of trade will be broken up and new ones opened. We desire to see our own country the standard-bearer in this great work."

Maury's desire that our country should be the standard-bearer was realized when, as a national undertaking, this country constructed the Panama Canal, which in time will doubtless be as powerful in developing our country and its commerce as he anticipated.

Transatlantic Transportation Urged by Maury and Other Far-seeing Southern Leaders

Another dream of Maury's was the plan of giving to Norfolk or the Hampton Roads basin direct communication with European ports. The idea of the French promoters of 1837 was revived about 1850, and a bill was introduced into Congress to charter a steamship line between Virginia and Antwerp. An argument advanced in its favor was that nearly all the mails of continental Europe passed through England and on to New York; that the direction of trade ever follows the line of postal communication, and for that reason mainly trade between America and Europe centered at New York. Should direct communication by steamers be established between Norfolk and Antwerp, Norfolk would at once secure the portion of continental mails which passed through Belgium, embracing a population of more than 100,000,000 and sweeping over a territory containing some of the finest agricultural and manufacturing districts of Europe. When this was done trade would necessarily follow, and Virginia's seaport, being the center of commercial intelligence, would become a center of commerce. A few years later a distinguished Frenchman was planning to arrange a line of steamships from the James River to ports in France. He was acting for the Franco-American Transatlantic Navigation Co., which it was claimed had a capital of 18,000,000 francs, and eight steamers with a line already operating to Rio, New York and New Orleans.

In the same period is found the convention at Bristol, Va., appointing Hon. Ballard Preston, formerly Secretary of the Navy, to visit Europe for the purpose of setting forth the financial and industrial condition of Virginia and the advantages to follow the establishment of direct trade connections, with special "reference to the speedy establishment of a suitable line of steamers between the waters of Virginia and Europe." Mr. Preston was requested also to report whether or not the vessels of the company owning the Great Eastern were likely to promote the objects of the convention. The Great Eastern, then in course of building, was one of the factors involved in the crusade of Ambrose Dudley Mann, a native of Hanover county, Virginia, who had served abroad in commercial diplomacy, and who resigned from office to devote himself to the upbuilding of Southern trade. In August, 1856, he sent an address to the South proposing the establishment of a weekly line of steamers of 20,000 tons capacity between Milford Haven, 120 miles southwest of Liverpool, and the Chesapeake Bay. The plan commended itself to the Southern Commercial Convention, which met at Savannah that year, and in September of the following year a convention at Old Point Comfort, over which Ex-President Tyler presided, endorsed it. Those in attendance at the convention showed their practical faith in the undertaking by subscriptions to stock. By March 15, 1858, the number of shareholders had grown to several hundred, when the Assembly of Virginia incorporated it as the Atlantic Steam Ferry Co., with permission to have a capital amounting to $50,000,000. Maury saw the immense possibilities in the plan. He wrote a letter dwelling upon the resources for foreign trade of the states behind Virginia; and alluding to the near completion of the Covington & Ohio Railway, giving, with the Blue Ridge road and the central, connection between the Seaboard and the Ohio, said it was "the most direct and favorable route that commerce can possibly have between western Europe and our West," and added: "In calling the attention of English capitalists to the great physical and natural resources of this part of the country, and in presenting for their consideration your rapidly drawn sketches of its production and present value, I hope you will be able to give them assurances that the Covington & Ohio Railway is to be pushed forward vigorously to completion, and that by the time they can get their ships ready this work will also be ready to fetch and carry for them."

In advocating the organization of this company Mann gave a most comprehensive outline of the tendency toward railroad construction and extension as a means to convey for transportation to foreign countries the cotton of the Carolinas, Georgia, Tennessee, Alabama, Mississippi, Louisiana, Arkansas, Florida and Texas; the tobacco, wheat and corn of Virginia, Tennessee, Maryland and Delaware; the pork and bacon and lard and tobacco of Kentucky and Missouri; the rice of South Carolina, and the resin and turpentine of the Carolinas. Quoting the estimate of expert judges, he said: "There is a sufficiency of iron and coal in Virginia, Tennessee and Kentucky to supply the wants of the Union for 100 centuries, while copper, lead, gypsum and salt exist in one or more of those states in immense quantities." And outlining the possibilities of freight from the South for foreign export, he said: "Steam or some motive power not yet discovered will be employed henceforth for propelling vessels in commerce or for belligerent purposes." His proposition looked to the organization of a company to start with four vessels

of the type and size of the Great Eastern, then under construction, claiming that "the number of such vessels required for the weekly ferry service would inspire the utmost respect for the American flag on the Atlantic," and that "from the military point of view four such steamships as the Great Eastern would be of inestimable advantage to the United States if they should ever be needed for active service." These vessels, according to his view, in times of peace would be practical naval schools for the attainment of knowledge of steam engineering. The amount of money required to transform the navy from sail to steam was too great to be undertaken, and, therefore, he added: "To obviate this and to render at the same time our position secure we must construct vessels, both for the Atlantic and the Pacific, which, while they will carry the olive branch of commerce in one hand, will carry in the other the sheathed sword."

These propositions represented the views of the leaders of the South of 75 years ago or more. They were not idle dreams; they were broad conceptions born of a comprehensive grasp of the situation and a desire to give the South its proper place in the commerce and industry of the country. They were enthusiastically endorsed and supported by the foremost business men of that day. Many of them failed of accomplishment solely because of the intervention of the War Between the States, which made impossible the carrying out of such undertakings. But their progressiveness and aggressiveness were not entirely for naught even at that early day. It is well that they should be recounted here in order to show the spirit of energy and activity dominant among Southern leaders in olden days from which have sprung the energies of the present. Many of the quotations given in the foregoing pages were compiled years ago, jointly by the late Edward Ingle, then on the editorial staff of the MANUFACTURERS RECORD, in collaboration with the writer, who began these investigations a third of a century ago or more.

TEN YEARS' RAILROAD PROGRESS BETWEEN 1850 AND 1860—IN THAT PERIOD THE SOUTH LED IN RAILROAD BUILDING

The decade ending with 1860 witnessed a very marked growth in Southern railroad and manufacturing interests; but notwithstanding the depression in cotton for several years, there was no decline in the steady advance that was making the South one of the richest agricultural sections of the world. During this time railroad interests were actively pushed, and the South constructed 7562 miles of new road, against 4712 by the New England and Middle states combined. In 1850 the South had 2335 miles of railroad, and the New England and Middle states 4798 miles; by 1860 the South had increased its mileage to 9897 miles, quadrupling that of 1850, while the New England and Middles States had increased to 9510 miles, or a gain of only about 100 per cent. In 1850 the mileage of the two Northern sections exceeded that of the South by 2463 miles. The conditions were reversed by 1860, and the South then led by 387 miles. In that decade the South expended, according to official figures, over $220,000,000 in the extension of its railroads, the great bulk of this having been local capital. This activity was not confined to any one state but covered the whole South, and every state made a rapid increase in its mileage. In Virginia there was an increase from 515 miles in 1850 to 1771 miles in 1860; in North Carolina the increase was from 248 miles in 1850 to 889 miles in 1860; in South Carolina, from 289 miles to 998; in Georgia, from 643 to 1404; Florida, from 21 to 401; Alabama, from 132 to 743; Mississippi, from 75 to 872; Louisiana, from 79 to 334; Kentucky, from 78 to 569; and Maryland, from 253 to 380. Neither Texas, Arkansas nor Tennessee had a single mile of railroad in 1850, but in 1860 Tennessee had 1197 miles, showing remarkable activity in construction during the decade, while Texas had 306 miles and Arkansas 38.

The percentage of increase in population in the South from 1850 to 1860, including the slaves, was 24 per cent, while in the rest of the country the gain, due largely to immigration, of which the South received practically none, was 42 per cent. Yet from 1850 to 1860 the South increased its railroad mileage 319 per cent, while in the balance of the country the gain was only 234 per cent. The South had one mile of road in 1860 to every 700 white inhabitants; the other sections all combined had one mile to every 1000 inhabitants. Thus, counting the whites only, the South led the country in its railroad mileage per capita, and, if the slaves be included, the South still stood a par with the country at large in per capita mileage.

INCREASE OF MANUFACTURES BETWEEN 1850 AND 1860 SUGGESTIVE OF EARLY DAYS OF SOUTHERN INDUSTRIAL PURSUITS

While devoting great attention to the building of railroads, the South also made rapid progress during the decade ending with 1860 in the development of its diversified manufactures. The census of 1860 shows that in 1850 the flour and meal made by Southern mills was worth $24,773,000, and that by 1860 this had increased to $45,000,000, a gain of $20,000,000, or nearly one-fourth of the gain in the entire country, and a much greater percentage of gain than in the country at large, notwithstanding the enormous immigration from Europe as well as from the South and East into the Western grain-producing states during that period. The South's sawed and planed lumber product of 1860 was $20,890,000, against $10,900,000 in 1850, this gain of $10,000,00 being largely more than one-third as much as the gain in all other sections combined, although, even counting the slaves, the South had, as already stated, only one-third of the country's population.

The advance in iron founding was from $2,300,000 in 1850 to $4,100,000 in 1860, a gain of $1,800,000, a very much larger percentage of increase than in the whole country. In the manufacture of steam engines and machinery the gain in the country, excluding the South, was $15,000,000, while the gain in the South was $4,200,000, the increase in the former case being less than 40 per cent and in the latter over 200 per cent. Cotton manufacturing had commenced to attract attention, and nearly $12,000,000 were invested in Southern cotton mills. In Georgia especially this industry was thriving, and between 1850 and 1860 the capital so invested in that state nearly doubled. It is true that most of the Southern manufacturing enterprises were comparatively small, but so were those of New England in their early stages. The South's were blotted out of existence by the war; by the same war an impetus was given to New England's, which became enormously prosperous, justifying great expansion. In the aggregate, however, the number of Southern factories of all kinds swelled to very respectable proportions, and the total number in 1860 was 24,590, with an aggregate capital invested of $175,100,000.

These facts are stated to indicate that the South in its early days gave close attention to manufacturing development, and that though later on the great profits in cotton caused a concentration of the capital and energy of that

section in farming operations, yet after 1840 there came renewed interest in industrial matters, resulting in a rapid advance between 1850 and 1860 in railroad construction and in manufactures. But this is only a small part of the evidence available to conclusively prove that great energy and enterprise were displayed by the people of the Old South.

Remarkable Agricultural Prosperity of South in 1860

For some years prior to 1850, while New England, having but little soil to make agriculture a possibility, was engaged almost wholly in manufacturing pursuits, all the energies of that section being directed to industrial development, the South, reaping great profits from its planting interests, was with equal energy and success and continued expansion giving itself to the cultivation of cotton, corn, sugar, rice and tobacco. The energy and enterprise displayed by the South in the extension of its agricultural interests was as great as the energy displayed in the development of New England's manufactures or that of the pioneers who opened the West to civilization. The South has been less given to vaunting its own achievements and the world has therefore heard less about them. More interesting than the record of Southern industrial advancement from 1850 to 1860 is the really remarkable agricultural prosperity of that decade and the magnitude of the products of Southern farms in 1860 as compared with the yield in the whole country. In order to rightly value all these comparisons, it should be remembered that the total population of the United States in 1860 was 31,000,000, of which the South had 6,800,000 whites and 4,100,000 negroes, or an aggregate of 10,900,000, just a little more than one-third of the total. With one-third of its population and less than one-fourth of its whites, the South raised more than one-half of the total agricultural products of the country. Comparing the production and farm value of the South and the remainder of the country as given in the census of 1860, we have the following table:

Production in 1860

	South	Rest of the country
Corn, bushels	358,153,000	472,297,000
Wheat, bushels	44,800,000	125,200,000
Cotton, bales	5,196,000	None
Tobacco, pounds	351,500,000	77,800,000
Rice, pounds	187,000,000	None
Sweet potatoes, bushels	38,000,000	3,600,000
Sugar, pounds	302,000,000	None
Peas and beans, bushels	11,878,452	3,309,661
Value of livestock	$467,498,364	$639,991,852
Value of animals slaughtered	$84,447,110	$128,424,543
Value of home-made manufactures	$16,585,281	$7,672,941
Cash value of farms	$2,308,409,352	$4,330,004,869

The world generally credits the Old South with having been only a producer of cotton, rice and sugar, but, as previously pointed out, the industrial and railroad interests were building up with great rapidity when the war came, and these figures exhibit a condition of agricultural diversity and prosperity which must amaze those who have regarded the ante-bellum South as a country lacking in energy. In 1860 the South had over 40 per cent of the total value of livestock, or $467,498,000 out of $1,100,000,000. The value of the farms in the United States in 1860 was $6,638,000,000, and of this the South had $2,300,000,000, or more than one-third of the whole, and an increase of $1,300,000,000 over 1850. It had $95,000,000 invested in agricultural implements out of a total of $246,000,000, or nearly 40 per cent. The increase in the value of its agricultural implements from 1850 to 1860 was nearly $35,000,000, or about 60 per cent.

Two-thirds of Our National Area Added to the Country Under Southern Men

Southern valor, personified in George Rogers Clark, in the closing years of the Revolutionary War made it possible for Southern generosity to confirm title of the United States to an area of about 250,000 square miles of land embraced in the Northwest Territory, from which subsequently were carved the great states of Ohio, Indiana, Illinois, Wisconsin and Michigan, with a part to spare for Minnesota. That achievement was typical of later deeds of Southern valor, forehandedness, diplomacy and statesmanship, which added 2,185,000 square miles to the 800,000 square miles of the United States and rounded out our adjacent continental possessions.

The foundations were laid in the Louisiana Purchase under Thomas Jefferson of 920,000 square miles in 1803, balking an inchoate breakup of the Union, assuring the North American Continent to what is known as Anglo-Saxon civilization and determining that our country should stretch from ocean to ocean instead of clinging to the Eastern seaboard. The rounding out began with the Florida Purchase of 1819 in the administration of James Monroe, adding about 75,000 square miles. The names of Presidents Tyler and Polk, of Generals Sam Houston, Winfield Scott and Zachary Taylor will always be identified with such events as the treaty of 1846, which fixed the northern boundary of the 245,000 square miles of territory now embraced in Idaho, Washington and Oregon, through which Meriwether Lewis and William Clark had trailed with the flag 40-odd years before, as the accession of the 260,000 square miles of Texas in 1845, and as the consequent war with Mexico, which left in the possession of the United States after the conclusion of the Gadsden Purchase of 1853—Gadsden being a South Carolinian—687,000 square miles now embraced in California, Nevada, Colorado, Utah, Arizona and New Mexico. The territory thus acquired is more than two-thirds of the total land area of what is today known as the continental United States. It is a monument to Southern foresight, energy and vigor—a monument to the empire-building power of our forefathers. The thought and action of the Old South for territorial expansion had no "provincial" or "parochial" limitations. They were nation-wide, and, indeed, world-wide in their consequences, and were paralleled in thought and action upon other lines.

Because these facts are not generally known the Old South is accused of having lacked energy and enterprise; its people are even now often charged with having been inferior to those of other sections in the development of their country and in the creation of wealth, and yet two-thirds of our national area was added to our country by the work of Southern men who had the vision and the daring to carry out these stupendous achievements which have not only shaped the destiny of America but of the world. It is impossible to measure the tremendous power of these achievements over world affairs in the past and for all the ages to come. Lacking in energy or ability or vision were these men of the South? Who dare to say so in the light of these facts. They made possible our country in all its greatness and power. They were the world's greatest empire builders of all time.

The South of today, throbbing with activity, is but a revival of the Old South, whose commercial spirit of broad activity crushed by the war is again seen in the develop-

ment of the same lines of industry to which this section was bending its energies prior to 1860. As the South made this nation possible by adding over 2,000,000 square miles to its territory, or two-thirds of its total, and as the South saved the country by saving itself from slipping into Haiti barbarism, so the South will again save the nation by overcoming the power of the alien elements which would destroy our Government

A Forecast of the South's Future

From the first announcement of this proposed publication its title has been given as

THE SOUTH'S DEVELOPMENT
A Glimpse of the Past
The Facts of the Present
A Forecast of the Future

We have somewhat changed the order of arrangement, and in the editorial entitled "The Facts of the Present" have briefly summed up some of these outstanding facts in order that every reader might mentally grasp the situation of today and see what has been accomplished. Following that is "A Glimpse of the Past," which, though lengthy, takes a historical survey of some of the business and scientific achievements of the Old South as indicating the inherited trait of character of all the generations which have come since colonial days, in order that with the background of the Old South and the facts of the present South the student of economic affairs, the investor seeking business opportunities, the manufacturer looking for locations for development, the homeseeker anxious to get away from the environment of the overlarge alien population of the North and West might be the better able to survey the whole environment and understand the strength and force of character, the moral integrity and the educational advance which he will need to know before deciding whether or not to cast his lot in this section.

In preference to making this forecast ourselves, and in order that we might avoid any possible charge of biased statements because of the relation of this paper to Southern development during the last 42 years, we have preferred to invite a number of the leading business men of the country to make this forecast for us. Elsewhere in this issue will be found brief letters in response to a request for an expression of opinion of from 100 to 500 words. What they say will carry greater weight than anything we could say. And yet it is a little difficult to restrain the desire to attempt to pull aside the curtain which veils from human eyes the mysteries of the future and indicate our thought as to the progress of the coming years.

Less than sixty years ago the South was a land of desolation. Blackened chimneys marked the sites of former splendid homes. Cities and towns had been almost destroyed. Farms had been laid waste. For four years the mighty fighting machine which stretched from Virginia to Texas had been steadily absorbing the flower of the South's manhood and impoverishing its people as few nations had ever been impoverished. Poverty like a great pall hung over the land. Anglo-Saxon civilization seemed doomed in this, the fairest spot on earth. No man born since 1876 can ever realize the wreck and ruin of those days when, slightly changing the language of General Sherman, hell had been let loose on earth. Truly was it said that a crow flying across the fairest valley of the South, perhaps the fairest on earth, would have had to carry its own rations or starve.

For four years the South's far-flung line had fought the mightiest battles of the ages. Tens of thousands of the South's foremost leaders were dead. Hundreds of thousands were cripples or invalids. The darkness of midnight rested upon the land. Men who had led the South's heroic armies on many a hard-fought battlefield now turned to the redemption of the South from poverty to prosperity. They led its people to greater victories in the construction of railroads, in the opening of mines, in the building of furnaces and factories, and in the creation of employment for hitherto idle hands, and in the re-establishment of governments, and the settlement of the greatest labor problem the world had known, than they had ever won on the battlefield.

In the light of the figures given as to what the South of today is doing, who can measure the illimitable possibilities of this section in the coming years?

In the following pages will be unrolled the panorama of the mightiest drama, the greatest business victory, the greatest achievement of any people recorded in human history.

Who Will Answer New England Manufacturers?—The South

A speaker at a recent New England convention, who happened to be a chamber of commerce secretary, so impressed the Mayor of Boston with his earnest oratory that the latter said to the convention, "If we had more men in New England of this man's type, we would be losing fewer industries to the South every year."

The Mayor of Boston was confusing types. All the polished orators of the nation cannot solve the troubles of New England manufacturers, so sorely overtaxed by their state and so greatly overwhelmed by anarchistic riffraff from Europe.

The South has never grumbled over the Northern cities taking away some of its finest sons for bank presidents, railroad executives and factory officials. But when the South invites New England cotton mills it is merely asking for what is its own by right of all general conditions and natural trade laws, and is serving the best interests of the New England manufacturers themselves.

The Mayor of Boston is rashly optimistic if he believes a multitude of orators can blind New England manufacturers to the facts that their labor condition has long been impossible for proper operation, and that many other conditions seriously interfere with the welfare of the industries in that section.

The Boston Mayor is much like that lawyer who told his client over the phone: "What! Did they put you in jail? Oh, no; they couldn't do that. Certainly not."

"But, —— it, I am in jail," was a reply that the lawyer couldn't very well answer, and neither can the New England public officials answer their manufacturers when they say: "But conditions in this section are intolerable, and we must go elsewhere."

A Prediction of Abram S. Hewitt

In a letter to the Manufacturers Record Abram S. Hewitt, referring to world conditions in iron and steel, said:

"The two great centers for dominating the iron and steel of the world are to be the Lake Superior region, with its Bessemer ores, on one side, and Alabama, with its basic ores, on the other. That section, with its abundant stores of ore and coal and limestone in such close proximity as is found in Alabama, bid fair within the next quarter of a century to dominate the basic-steel industry of the world."

ECONOMIC SURVEY OF THE UNITED STATES, 1880-1923

Total Area, 3,026,789 Square Miles; Land, 2,973,776 Square Miles; Water, 53,013 Square Miles

	1880	1900	1910	1923
Population	50,155,783	75,994,575	91,972,266	110,663,502
Property, true value	$43,642,000,000	$88,517,307,000	†$186,299,664,000	‡$320,803,862,000
Manufactures:				
Capital	$2,790,272,600	$8,975,256,496	$18,428,270,000	*$44,688,094,000
Products, value	$5,369,579,191	$11,406,926,701	$20,672,052,000	¶$43,653,283,000
Mines, Quarries and Wells:				
Capital	.....	.....	$3,380,525,841	*$6,955,466,831
Products, value	.....	.....	$1,238,410,322	*$3,228,023,845
Cotton Manufacturing:				
Capital	$208,280,000	$467,240,000	$822,237,000	*$1,914,919,000
Products, value	$192,090,000	$339,200,000	$628,392,000	¶$1,330,263,000
Spindles, number active	10,653,435	19,050,952	28,113,440	36,260,001
Looms, number active	225,759	455,752	682,000	*692,169
Cotton consumed, pounds	750,343,981	1,817,643,000	2,189,000,000	3,335,000,000
Cottonseed Oil Mills:				
Capital	$3,800,000	$34,451,000	$91,086,000	*$181,888,099
Products, value	$7,690,921	$58,726,632	$147,868,000	*$505,000,000
Furniture Manufacturing:				
Products, value	$79,585,000	$130,634,000	$239,887,000	*$571,356,000
Pig Iron made, tons	3,835,191	13,789,242	27,303,567	40,361,146
Coke made, tons	3,338,300	20,533,348	41,708,810	55,487,000
Lumber cut, feet	18,087,356,000	34,780,513,000	40,018,282,000	‡31,568,888,000
Mineral Products, value	$367,463,000	$1,108,927,000	$1,991,216,000	‡$4,647,290,000
Coal mined, tons	71,481,570	269,684,027	501,596,378	648,644,000
Iron Ore mined, tons	7,120,362	27,553,161	56,889,734	69,351,442
Petroleum, barrels	26,286,123	63,620,529	209,556,048	732,407,000
Bauxite production, tons	.....	23,184	148,932	522,690
Phosphate mined, tons	211,377	1,491,216	2,654,000	‡2,336,856
Sulphur produced, tons	600	3,525	255,534	2,036,097
Approximate Land Area, acres	.....	1,903,289,600	1,903,289,600	*1,903,216,640
All Land in Farms, acres	.....	838,591,774	878,798,325	*955,883,715
Improved Land, acres	284,771,042	414,498,487	478,451,750	*503,073,000
Number of Farms	.....	5,737,372	6,361,502	*6,448,343
Value all Farm Property	$12,104,001,538	$20,439,901,164	$40,991,449,090	*$77,924,100,338
Value Farm Land	.....	$13,058,007,995	$28,475,674,169	*$54,829,563,059
Farm Products, value	$2,212,541,000	$4,717,000,000	$8,494,230,307	$16,064,600,000
Farm Crops, value	.....	$2,998,704,000	$5,231,851,000	$9,953,400,000
Cotton Crop:				
Bales, number	5,761,000	9,436,000	11,609,000	10,081,000
Value without seed	$313,690,000	$363,770,000	$820,407,000	$1,563,347,000
Value, including seed	.....	$410,721,000	$963,267,000	$1,750,000,000
Tobacco Crop, pounds	506,663,000	868,112,865	1,055,764,806	1,474,786,000
Grain Crop:				
Corn, bushels	1,717,434,000	2,105,102,000	2,886,260,000	3,046,387,000
Wheat, bushels	498,549,000	522,229,000	635,121,000	785,741,000
Oats, bushels	417,885,000	809,126,000	1,186,341,000	1,299,823,000
Live Stock:				
Cattle, number	34,932,000	67,719,000	61,804,000	66,801,000
Sheep, number	42,192,000	61,504,000	52,448,000	38,361,000
Swine, number	47,682,000	62,868,000	58,186,000	65,501,000
Horses, number	10,357,000	18,267,000	19,833,000	18,263,000
Mules, number	1,800,000	3,265,000	4,210,000	5,436,000
National Banks:				
Resources	$2,105,786,626	$5,048,138,499	$9,956,476,831	$22,406,128,000
Capital	$466,365,085	$630,299,031	$1,004,288,107	$1,325,825,000
Deposits	$873,537,637	$2,508,248,557	$5,304,788,306	$14,541,138,000
Other Banks, deposits	$1,319,094,976	$4,780,893,692	$9,996,180,000	$27,013,525,000
Exports, value	$835,638,658	$1,394,483,082	$1,744,984,720	$4,159,270,000
Imports, value	$667,954,746	$849,941,184	$1,556,947,430	$3,775,191,000
Railroad Mileage	93,267	193,346	240,439	‡250,413
Highway Expenditures	.....	**$59,527,170	††$240,263,784	$1,000,000,000
Public Schools, expenditures	$78,094,687	$214,964,618	‡‡$371,344,410	‡$1,580,671,000

*Census 1920. †1912. ‡1922. ¶1921. **1904. ††1914. ‡‡1908.

ECONOMIC SURVEY OF THE SOUTH, 1880-1923

Total Area, 969,237 Square Miles; Land, 945,090 Square Miles; Water, 24,147 Square Miles

	1880	1900	1910	1923
Population	18,538,340	27,445,457	32,480,343	37,686,370
Property, true value	$9,177,000,000	$17,919,187,000	†$40,631,405,000	‡$71,375,367,000
Manufactures:				
Capital	$329,752,408	$1,196,302,086	$2,885,927,698	*$6,883,171,000
Products, value	$622,840,982	$1,564,183,490	$3,158,388,799	‘$6,877,844,000
Mines, Quarries and Wells:				
Capital	.....	.....	$657,011,924	*$2,274,509,653
Products, value	.....	.....	$213,540,100	*$1,127,574,868
Cotton Manufacturing:				
Capital	$21,646,000	$130,253,000	$360,230,000	$1,000,000,000
Products, value	$20,855,000	$99,118,000	$234,890,000	‘$560,813,000
Spindles, number active	687,066	4,467,383	11,149,465	16,344,000
Looms, number active	14,754	113,106	236,845	305,577
Cotton consumed, pounds	111,777,177	749,915,000	1,121,960,000	2,161,345,000
Cottonseed Oil Mills:				
Capital	$3,800,000	$34,450,000	$87,000,000	*$178,000,000
Products, value	$6,797,261	$56,269,746	$136,000,000	*$502,000,000
Furniture Manufacturing:				
Products, value	.....	$15,592,000	$25,332,000	*$91,622,000
Pig Iron made, tons	448,978	2,642,720	3,447,291	4,557,106
Coke made, tons	372,436	5,799,384	8,966,959	9,519,000
Lumber cut, feet	3,810,038,000	14,437,179,000	21,235,437,000	‡15,890,134,000
Mineral Products, value	$18,225,228	$129,857,303	$369,678,060	‡$1,491,020,000
Coal mined, tons	7,002,254	54,510,460	120,856,340	196,750,000
Iron Ore mined, tons	1,096,341	4,748,815	7,002,340	7,436,949
Petroleum, barrels	179,000	17,102,047	79,993,639	367,916,000
Bauxite production, tons	.....	23,184	148,932	522,690
Phosphate mined, tons	190,763	1,489,907	2,650,000	‡2,319,375
Sulphur produced, tons	.....	3,000	250,000	2,036,097
Approximate Land Area, acres	.....	604,856,320	604,856,320	*604,857,600
All Land in Farms, acres	.....	394,967,996	388,005,242	*383,952,001
Improved Land, acres	101,975,175	148,254,126	174,558,500	*181,259,539
Number of Farms	.....	2,895,590	3,363,955	*3,459,528
Value all Farm Property	$2,762,076,984	$5,262,278,962	$10,961,865,176	*$21,685,380,495
Value Farm Land	.....	$3,233,461,852	$7,337,319,297	*$14,876,960,220
Farm Products, value	$756,903,000	$1,492,000,000	$2,993,990,072	$6,127,400,000
Farm Crops, value	.....	$1,104,531,000	$2,020,600,000	$4,402,200,000
Cotton Crop:				
Bales, number	5,723,000	9,300,000	11,599,000	9,912,000
Value without seed	$313,000,000	$340,943,000	$809,030,000	$1,535,662,000
Value, including seed	.....	$387,894,000	$951,890,000	$1,720,000,000
Tobacco Crop, pounds	.....	668,647,226	807,991,221	1,264,852,000
Grain Crop:				
Corn, bushels	627,287,000	671,507,000	1,104,042,000	888,739,000
Wheat, bushels	84,864,000	130,862,000	113,992,000	138,080,000
Oats, bushels	80,516,000	108,693,000	143,810,000	164,693,000
Live Stock:				
Cattle, number	14,189,000	25,224,000	22,010,000	22,051,000
Sheep, number	10,365,000	8,652,000	9,006,000	7,008,000
Swine, number	21,132,000	23,086,000	22,814,000	18,912,000
Horses, number	3,369,000	5,433,000	5,645,000	4,823,000
Mules, number	1,370,000	2,626,000	3,377,000	4,336,000
National Banks:				
Resources	$194,084,458	$705,827,594	$1,830,095,231	$4,539,199,000
Capital	$53,888,930	$106,503,970	$225,698,230	$332,147,000
Deposits	$73,124,523	$334,649,680	$899,203,608	$2,881,870,000
Other Banks, deposits	$117,440,491	$346,803,574	$1,056,732,000	$3,633,117,000
Exports, value	$264,906,000	$484,644,200	$628,487,700	$1,409,579,000
Imports, value	$35,923,390	$52,094,150	$128,735,700	$411,513,000
Railroad Mileage	24,866	61,701	85,739	‡90,323
Highway Expenditures	.....	**$12,636,839	††$57,517,980	$291,945,000
Public Schools expenditures	$12,471,000	$35,037,600	‡‡$65,150,000	‡$315,915,000

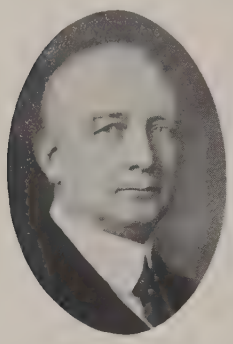
*Census 1920. †1912. ‡1922. ‘1921. **1904. ††1914. ‡‡1908.

The South's Part in Our Nation's Governmental Development and Territorial Expansion

By Harry F. Atwood, President Constitution Anniversary Association, Chicago, Ill.

The political development of this nation may properly be considered under five headings:

1. The settlement and development of the colonies.
2. The securing of independence.
3. The creation, adoption, administration and interpretation of the Federal Constitution.
4. The expansion of our territory.
5. The development of American institutions.



Harry F. Atwood

Colonial Period

The South has the great honor of having planted the first and last of the thirteen original colonies—Virginia in 1607, thirteen years before the Plymouth Colony, and Georgia in 1733.

In 1619, at Jamestown, Va., was organized the first government in America, known as the House of Burgesses, which provided for a representative assembly, consisting of two delegates from each of the eleven boroughs. The new government was composed of a Governor, Council and Assembly. This threefold government furnished later a basis for other state governments and the National Government. It served as a training school for Virginia statesmen. Among its more famous members were Washington, Jefferson, Madison, Monroe, Richard Henry Lee, Patrick Henry, Edmund Pendleton, Benjamin Harrison, Richard Bland, Edmund Randolph and George Mason.

When the Revolutionary War came 150 years later, the House of Burgesses furnished both the Army and Congress with a longer list of brilliant soldiers and statesmen than any other assembly in America.

During colonial days much pioneer work was done by the Southern colonies toward the west and the northwest. As early as 1718, Alexander Spottswood, with fifty Virginia cavaliers, marched over the wall of the Blue Ridge to explore the Northwest country.

In 1749 King George granted to the Ohio Company, a group of wealthy Virginians, including a brother of George Washington, 500,000 acres of land in the Ohio Valley, near the head of the Ohio River.

In 1753 Governor Dinwiddie of Virginia sent George Washington, then a young engineer, to warn the French not to occupy that territory.

In 1769 Daniel Boone and his brother led an expedition of exploration into the territory of Tennessee and Kentucky which was financed by the Carolinians.

A little later James Herrod led another expedition from Virginia into the Northwest.

While the colonies were establishing their local governments and planning their future activities, the British Parliament in 1765 passed the Stamp Act and other legislation which aroused the resentment of the colonies. and finally resulted in the Boston Tea Party and other forms of resistance.

When the Boston Tea Party occurred, Christopher Gadsden of South Carolina wrote: "Do not pay for another ounce of tea"; George Washington said: "I will raise a thousand men, subsist them at my own expense and march at the head of them for the relief of Boston"; and Patrick Henry made his famous "Caesar had his Brutus" address, which really fired the colonies with the spirit of independence.

The Securing of Independence

Conditions became so critical that a Continental Congress was called to meet in Carpenter's Hall, Philadelphia, on the 5th of September, 1774, and Peyton Randolph of Virginia, who in 1764 as a member of the House of Burgesses drew up an address to the King against the passage of the Stamp Act, which was voted by that body, was unanimously chosen President of the Congress. He was succeeded by Henry Middleton of South Carolina, who became the second President of the Continental Congress. This Congress adopted a declaration setting forth the claim that the British Parliament had violated the rights of the colonies.

In 1775 the Continental Congress met a second time and commissioned George Washington as commander-in-chief to organize and lead an army in the name of the United Colonies, and he took command at Cambridge, Mass., July 3, 1775.

Soon came the brave Daniel Morgan with his Virginia riflemen in hunting shirts, bearing Patrick Henry's famous words, "Liberty or Death." Morgan saluted Washington and said, "From the right bank of the Potomac, General!" Washington dismounted and with tears in his eyes went along the ranks shaking hands in turn with each man. They were his own neighbors come to help in the military campaign in the North.

Early in 1776 the sentiment for independence was growing rapidly throughout the colonies. In June of that year Richard Henry Lee, in accordance with instructions from the Virginia Convention, introduced into the Continental Congress a resolution that "these United Colonies are, and of right ought to be, free and independent states; and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved."

The resolution was adopted June 11, and a committee was appointed to prepare a Declaration of Independence. The document was drawn up by Thomas Jefferson and revised, with very few changes, by the Congress.

On July 4, 1776, the representatives of twelve colonies without dissension adopted and agreed to support the Declaration of Independence. Thenceforth the thirteen British colonies became the United States of America, with a war on between the powerful nation of Great Britain and the young continental states.

When the Revolutionary War began, the British claimed

possession of the territory north of the Ohio between the Mississippi and the Alleghanies.

While Washington and his armies were guarding the front door of the colonies against the attacks of the British Army, George Rogers Clark, that notable figure of American expansion who had founded Kentucky and had done much pioneer work, was leading the forces in the Northwest Territory and closing the back door on the British Army. In this undertaking Clark was authorized and supported by Patrick Henry, then Governor of Virginia, who also helped to finance the movement.

It was the brilliant and successful leadership of Washington in the East and Clark in the West that made possible the victorious outcome and the Treaty of Peace in Paris September 3, 1783, in which Great Britain surrendered all claim to the territory extending from the Atlantic Ocean on the east to the Mississippi River on the west, and from the Great Lakes on the north to Spanish Florida on the south.

During the Revolutionary War the Continental Congress drew up the Articles of Confederation for a National Government, hoping thereby to facilitate unity of procedure.

After the Treaty of Peace with Great Britain in 1783 there was much conflict among the states as to the title of what had been called the Northwest Territory.

North Carolina possessed an undisputed claim to the western territory coextensive with the present state of Tennessee.

South Carolina possessed an undisputed claim to a strip about twelve miles wide, extending from the present limits of the state westward to the Mississippi and running along the southern border of Tennessee.

Georgia possessed an undisputed claim to all south of this strip to the Florida line.

Virginia claimed the whole territory from her southern boundary line, extending to the Mississippi and up northward to the Great Lakes, including Kentucky and all the country which afterward became the Northwest Territory, based upon her charter, and upheld by actual possession and civil and military occupation.

Massachusetts and Connecticut claimed that their charters extended westward to the Mississippi, covering the narrow belts running across the territory in possession of Virginia, and embraced in the westward extension of their respective northern and southern boundary lines; but neither of these states had settled any portion of that territory.

The charter claimants finally ceded the entire territory to the United States, for which the Old Dominion of Virginia deserves great credit and much gratitude.

The total contribution of the South was 445,354.91 square miles, of which 351,040 square miles was undisputed and 94,314.91 square miles was disputed. The cessions of Massachusetts and Connecticut amounted to 94,314.91 square miles, all of which was disputed by Virginia. This more than doubled the territory of the original colonies, for which the South deserves almost entire credit.

After Virginia ceded the territory of the Northwest, her representatives in the Continental Congress played an important part in the drafting and passage of the famous document historically known as the "Ordinance of 1787," which provided for a government for that portion of the country and for dividing it into five states. This is generally regarded as the most important piece of legislation enacted by the Continental Congress, and one of the most important ever enacted in the history of this country. This act bestowed upon Virginia the proud title of "Mother of States," and later Virginia was called "Mother of Presidents," as she furnished four of the first five Presidents who served 32 of the first 36 years during the early life of this republic.

The Federal Constitution

The Articles of Confederation, ratified in 1781, proved wrong in theory and weak in practice. On every hand were bankruptcy, chaos and disorder. These conditions emphasized the pressing need of a strong central government as a basis for orderly progress and unity of action.

In 1786 difficulties arose regarding trading conditions on Chesapeake Bay and the Potomac, and a resolution was introduced in the Virginia House of Burgesses for calling a trade convention of delegates to meet at Annapolis. The delegates to the Annapolis Convention saw clearly that if the states should create rules for regulating trade, there was no central authority to enforce them, so they passed a resolution calling upon Congress to provide for a convention to be held at Philadelphia for the purpose of revising the Articles of Confederation. Congress acted favorably on the resolution, and the Convention, which resulted in the adoption of the Constitution of the United States, was called for May 14, 1787.

The delegates sent to the Constitutional Convention were the greatest group of giants from the standpoint of physical vigor, mental acumen, practical wisdom, farsighted vision and moral courage that ever assembled for human achievement.

Washington was unanimously chosen chairman of the Convention, and wielded a most wholesome and potent influence on its deliberations.

Edmund Randolph, Governor of Virginia and a delegate to the Convention, presented what has become known as "the Virginia Plan" for a Federal Constitution. It had been agreed upon by the delegates from Virginia, and Madison and Washington had an important part in its preparation.

A plan was also presented by Charles Pinckney, a delegate from South Carolina, which he afterwards said was the only plan submitted that was completely drawn in articles and sections. These plans were very helpful in the preparation of the Federal Constitution.

During the Convention James Madison took notes and worked evenings in an endeavor to keep as accurate a record as possible. His memoranda became known as the Madison Papers, and they were sold to the Government after the death of Madison, who was the last survivor of the Constitutional Convention, by his widow, Dolly Madison, 50 years later. These papers have been a very important source of information in a study of the Constitution and the deliberations of the Convention.

Major William Pierce, a delegate to the Convention from Georgia, made brief sketches describing intimately the personal appearance, deportment and intellectual characteristics, style of debate and public records of the delegates. These memoranda were published in a newspaper in Savannah, and are generally included in any authentic account of the debates of the Constitutional Convention.

The able discussions of George Washington, James Madison and John Marshall for ratification of the Constitution were helpful in securing ratification in other states as well as Virginia.

George Washington was chosen the first President of the new republic to administer the Government under the Constitution. So great was his service that we call him the "Father of His Country," and proclaim him "first in war, first in peace and first in the hearts of his countrymen."

During 40 of the first 48 years of the new Government under the Constitution, the Presidency was occupied by

men of the South—Washington, Jefferson, Madison, Monroe and Andrew Jackson, each having served two full terms; and of the first 15 Presidents, 10 were men of the South. During that period quite a substantial majority of the Cabinet members, who served in the various executive departments, were Southern men.

Space forbids the mention of the long list of brilliant Southern men who served in Congress, of whom Hugh Williamson of North Carolina, Charles Pinckney, Hayne and Calhoun of South Carolina, Henry Clay of Kentucky, Sam Houston of Texas and Thomas H. Benton of Missouri are conspicuous examples.

For some reason the Supreme Court did not seem to function with virility during the first twelve years under the Constitution.

Washington appointed John Jay first Chief Justice of the Supreme Court in 1789, and he resigned in 1795 to enter the diplomatic service.

In 1801 President Adams offered to reappoint John Jay Chief Justice of the Supreme Court, and he declined the appointment with the following words:

> "I left the bench perfectly convinced that under a system so defective it would not obtain the energy, weight and dignity which was essential to its affording due support to the national government; nor acquire the public confidence and respect, which, as a last resort of the justice of the nation, it should possess. Hence, I am induced to doubt both the propriety and expediency of my returning to the bench under the present system."

This situation called for a great jurist of paramount ability, uncompromising integrity and strong moral courage. Such was John Marshall of Virginia, who, on February 4, 1801, the day of the first meeting of the Court in the permanent capital of the nation, took his place as Chief Justice. He served from 1801 to 1834. Of eleven hundred and six opinions filed during that time, five hundred and nineteen were delivered by Marshall, the remainder being about equally divided among the fifteen who were from time to time his associates. Of the sixty-two decisions delivered upon constitutional questions from 1801 to 1835, thirty-six were by Marshall.

William Pinckney said of John Marshall: "He was born to be the Chief Justice of any country into which Providence should cast him." He established the uncontradicted fact that the great, saving, protecting balance wheel of the American Government has been the Supreme Court of the United States.

Marshall was succeeded by Roger B. Taney of Maryland, who served as Chief Justice from 1834 to 1864. Thus the South provided the Chief Justice of the Supreme Court during 64 of the first 76 years of this Republic.

Expansion of Territory

Title to the Florida territory and the vast unexplored country between the Mississippi River and the Pacific Ocean was yet to be determined between the states and European claimants.

Louisiana Purchase

In 1803 President Thomas Jefferson sent James Monroe as a special envoy to France to assist Mr. Livingston, our Minister to France, to negotiate with Napoleon for the purchase of Louisiana. The purchase was made from France for $15,000,000, and it covered more territory than was contained in the states up to that time, so that it more than doubled the territory of the United States.

This has generally been regarded as the most important event of Jefferson's Administration.

War of 1812

The War of 1812 was successfully conducted under the leadership of President James Madison as Commander-in-Chief of the Army and Navy.

It greatly increased the respect of foreign nations for the new republic of the United States of America, and made easier possibilities for further expansion of territory during the years that followed.

Florida Purchase

Under the administration of James Monroe in 1819, Florida was purchased from Spain for $5,000,000. This was made possible through the pioneer work and brilliant military operations under the leadership of Andrew Jackson, and he was appointed governor of the territory.

Monroe Doctrine

Owing to the attitude of foreign countries with reference to the establishment of colonies on the Western Hemisphere, President Monroe in 1823 sent a message to Congress in which he declared substantially "that the American continents, by the free and independent condition which they have assumed and maintained, are henceforth not to be considered as subjects for future colonization by any European powers."

This statement came to be known as the Monroe Doctrine, and in conjunction with portions of Washington's Farewell Address, delivered on his retirement as our first President, has made a very substantial part of what has been regarded as our "foreign policy."

Annexation of Texas

In 1820 people of the South began migrating to Texas, which was then a part of Mexico, under the leadership of Stephen F. Austin and Sam Houston, whose names have been honored by two of the leading cities of that great Commonwealth.

Differences arose between the settlers in Texas and the Government in Mexico, and the settlers successfully won their independence and set up the Republic of Texas, and later sought annexation to the United States.

In December, 1845, Texas was admitted to the Union under the Administration of James K. Polk.

Sam Houston, who served as commander-in-chief of the military forces against the Mexican and Spanish armies, was the great central figure in its achievement.

Oregon

The Northwest Territory, comprising what is now the states of Oregon, Washington, Idaho and part of Montana, had been in dispute between the United States and Great Britain for a number of years. As early as 1803 Thomas Jefferson secured consent from Congress to organize a military expedition of exploration to that country. The expedition was conducted under the leadership of two Virginians, Meriwether Lewis and William Clark, a brother of George Rogers Clark, who had distinguished himself in the Northwest Territory.

The explorations of Lewis and Clark gave the United States a basis for claiming the Oregon country, and in 1846 a settlement was adjusted under the Administration of James K. Polk of Tennessee, fixing title in the United States for the payment of $5,000,000. The success of this important achievement was due in large measure to the intrepid leadership, convincing logic and stirring eloquence of Thomas H. Benton, the brilliant, aggressive United States Senator from Missouri.

Mexican War

After the annexation of Texas a dispute arose between the states of Texas and Mexico as to boundary lines. This resulted in the Mexican War. Our military forces were led by Zachary Taylor of Louisiana, who was subsequently

elected President of the United States, and under the Administration of President James K. Polk a settlement was made with Mexico for all of the territory west of Texas and south of Oregon for $15,000,000.

By the steps which have been above described, the Florida Purchase in 1819, the Texas Annexation in 1845, the Oregon Settlement in 1846 and the Mexican Cession in 1848, the United States, under the Administrations of James Monroe and James K. Polk, had become possessed of the entire territory south of the Georgia line and west of the Louisiana Purchase. Thus again the area of our country was more than doubled.

Summary

The South deserves full credit for all and much more than is enumerated here in this brief skeleton statement. If space would permit, the names of hundreds of other brave and brilliant Southerners might be included as participating in this array of mighty and almost matchless achievements, but I have endeavored here to give only a bare outline of the essential facts.

We find:

That the South had the distinguished honor of planting the first and last of the original thirteen colonies, and playing an important part in colonization and development.

That the Virginia House of Burgesses was the first government established in America, and that it served as a model for other state governments and was a great force in building the National Government.

That the splendid pioneer work of Spottswood, Herrod and their followers in the Northwest, of Daniel Boone and his companions in Tennessee and Kentucky, and the splendid pioneer exploring and military work of George Rogers Clark and his followers in Kentucky and the country north of the Ohio River formed a substantial basis for claiming title to that territory by the colonists later on.

That the South furnished the first two Presidents of the Continental Congress.

That Patrick Henry of Virginia sounded the keynote of independence.

That Richard Henry Lee, in accordance with instructions from the Virginia Convention, introduced into the Continental Congress a resolution that "these United Colonies are, and of right ought to be, free and independent states."

That Thomas Jefferson was the author of the Declaration of Independence.

That Washington was the leader of the armies during the Revolutionary War and had tremendous support from the South.

That George Rogers Clark and his followers, authorized and supported by Patrick Henry, then Governor of Virginia, were halting the onslaught of the British forces on the west, while Washington was guarding the eastern coast, thus making possible the Treaty of Peace in 1783.

That men of the South had an important part in framing the Federal Constitution and securing its adoption, and were most conspicuous in its early administration.

That the Madison Papers and Pierce memoranda have thrown much light on the proceedings of the Constitutional Convention.

That the potential work of John Marshall aided greatly in the successful operation of the Constitution.

That the magnanimity of the Southern states in ceding to the United States, as charter claimants, that vast territory extending to the Mississippi River more than doubled the area of the original thirteen colonies and made possible the Ordinance of 1787.

That the executive work of Jefferson and the diplomatic work of Monroe made possible the Louisiana Purchase, which again more than doubled the area of the country.

That the pioneer work and military operations led by Gen. Andrew Jackson made possible the Florida Purchase under the Administration of James Monroe.

That under President James Madison as Commander-in-Chief of the Army and Navy the War of 1812 was successfully waged against England.

That portions of Washington's Farewell Address and the Doctrine proclaimed by Monroe have constituted a very substantial part of our foreign policy.

That the splendid pioneer exploring work, military operations and insistent advocacy of Sam Houston and his followers made possible the annexation of Texas under the Administration of James K. Polk.

That the pioneer work of Meriwether Lewis and William Clark, brother of the George Rogers Clark who did such famous work in the Northwest Territory, and the persistent, effective and eloquent pressure of Thomas Benton made possible the Oregon purchase, also under the Administration of James K. Polk.

That Zachary Taylor was the successful leader of the military forces in the Mexican War, which resulted in securing the California territory, also under the Administration of James K. Polk.

That the Florida Purchase, Texas Annexation, Oregon Purchase and the Mexican Cession for a third time more than doubled the area of the country.

An equally interesting study could be made of the South's part in our religious, educational, agricultural, inventive, mechanical, industrial and professional development.

There is no thought or wish to detract from the great service rendered by the splendid patriots of Northern states.

It is an inspiration to contemplate our entire achievement as a great people and the fine spirit of co-operation that prevailed between the North and South in developing our American institutions.

I love to think of how effectively George Washington worked with Alexander Hamilton, James Madison with Benjamin Franklin, Thomas Jefferson with Thomas Paine, the Pinckneys with the Adamses, the Randolphs with the Morrises, John Rutledge with John Hancock, Patrick Henry with Paul Revere, George Rogers Clark with John Jay, George Mason with James Otis, John Marshall with Daniel Webster, Andrew Jackson with John Quincy Adams; of Joe Wheeler of the Gray with William McKinley of the Blue, and Richmond Hobson with George Dewey in 1898, and of the magnificent co-operation of the entire country during the great World War.

From the time of the adoption of the Constitution and all through the periods of territorial expansion the three aggravating, outstanding questions were:

What are the rights of the states with reference to the Federal Government?

Have states the right to secede under any condition?

What shall be the status of the institution of slavery?

The generation of the sixties inherited these three questions in a most perplexing form.

Regardless of how we may feel as to whether or not these questions could have been handled more intelligently and with better results, we can truthfully say that in no war in history have men on both sides fought with such heroic valor and firm conviction; that no army ever surrendered under a braver soldier, a greater general or a more gallant gentleman than that magnetic man, Robert E. Lee; and that no surrender was ever accepted under a greater general than the persistent, silent soldier, that magnanimous commander, Ulysses S. Grant.

When Lee surrendered, Grant said: "Sheathe your swords; take back your men, take back your horses; you will need them down there to develop that great fertile country for which God and nature have done so much."

However we may feel about the difficulties and the tantalizing hardships of the reconstruction period, we can all rejoice as Americans—

That the outcome was the union of states under one flag, the glorious old Stars and Stripes, with no further thought of secession.

And—

That Lincoln, who came from the South as Commander-in-Chief, could say in the most trying times: "We are not enemies but friends; we must not be enemies; though passion may have strained, it must not break the bonds of affection. The mystic chords of memory stretching from every patriot grave to every heart and hearthstone all over this broad land will yet swell with the chorus of the Union when touched again, as it surely will be, by the better angels of our nature."

Let us fervently hope and devoutly pray that the chorus of a more perfect Union will continue swelling with more and more harmonious co-operation throughout all time.

From the time of the Civil War to the dawn of the Twentieth Century public offices were held and public service rendered quite largely by those who participated in that great conflict in which their patriotism was aroused to a lofty pitch, and it can be truthfully said that during that period public affairs were quite generally well conducted.

The past is secure, magnificent without parallel in world history. What of the present? Are we ceasing to realize that a mighty heritage brings with it grave responsibilities?

What of the Present and Future?

Among the successors to the men who followed Lincoln and Lee there has developed in our public life during the last quarter of a century quite a proportion of demagogues who have shown little regard for the landmarks of history, little respect for the teachings of experience, and slight understanding of the value and importance of the Constitution.

The destructive forces in this republic are militant, active and aggressive, assailing the spirit and genius of American institutions as bequeathed to us.

They are striving with considerable success—

To substitute direct primaries for the convention plan of nominating candidates, which means confusion and the gradual supplanting of statesmen with demagogues;

To substitute socialistic, paternalistic and Government ownership fallacies for the institution of individual property rights;

To substitute class consciousness, class agitation and class legislation for individual responsibility, for individual conduct and reward in proportion as the individual develops capacity for service or character to be trusted;

To break down the courts of justice and throw out of gear the fine checks, balances and restraints which were conceived with such harmony by the authors of the Constitution;

To write statutory material into the Federal Constitution as amendments;

To set up meddlesome, regulatory and dictatorial boards, bureaus and commissions in the Federal Government which are destroying the proper functioning of state governments as contemplated by the Constitution, all of which means drifting from orderly progress into chaos.

Those who should make up the constructive forces of the country in both the North and the South, with rare exceptions, are—

Hesitant to the point of cowardice,
Vacillating to the point of embarrassment,
Expedient to the point of hypocrisy,
Apologetic to the point of humiliation,

with no clear-cut issues or definite program, without leadership, merely marking time, neglecting to acquire a clear understanding of the cause of America's greatness or to disseminate constructive thought.

It is high time for those who should make up the constructive forces of the South and of the North to forgive all things that need forgiveness; to forget all things that need forgetting; to unite in a solid phalanx and press forward to make the present worthy of the historic past and justify confidence in a mighty future.

God grant that sympathetic response may be made to the constant and stirring appeals of that courageous, masterful and inspired editor of the Manufacturers Record, Richard H. Edmonds.

He is the beacon light of the South, urging, and urging always, what is right and what is best.

May the South now in this hour of need, as in the early days of the republic, give us a Washington and a Marshall, who shall plant our feet on solid ground and lead us in a grand march toward a glorious destiny!

Origin of the Word "Dixie"

With the consolidation of the ninety-one-year-old Citizens Bank & Trust Co. of New Orleans recently with another bank, the New Orleans Daily States called attention to the origin of the term "Dixie" as applied to the South, which was discovered in old chronicles of the Mississippi Valley and the records of the old bank.

During the early pioneering days this New Orleans bank was well known and its banknotes commanded respect throughout the whole Mississippi Valley and the rest of the country as well. Its notes were printed in French and English. The common denomination was the ten-dollar note, and it bore the Roman numeral X and the Arabic numeral 10. Also in the middle of the back of the note was printed in French the word "Dix" (ten) amidst other lettering in French.

As the Mississippi River was the highway of traffic and business between New Orleans and the North, and these notes became widely circulated up the Valley and elsewhere, the river boatmen and others, not being familiar with French and not knowing the proper pronunciation of the word "Dix," began calling the notes "Dixes." From "Dixes" to "Dixie" the step was easy, for it is stated that these people would say they were going to Louisiana and bring back a pocket full of "Dixes," or that they were going down to the "land of Dixes," or, briefly, to "Dixie Land."

Shortly after that Daniel Emmett, the minstrel, wrote the song "Away Down South in Dixie." This song was first published in New Orleans by a music house which is still doing business in that city.

Some "First" Things In America

At Jamestown and on the James River in Virginia were established the first church, the first wharf, the first glass factory, the first windmill, the first iron works, the first wheat and tobacco raised, the first peaches grown, the first brick house, the first statehouse and the first free school. Democracy was born in this section with the establishment of jury trial, courts for the administration of justice, popular elections in which all the inhabitants took part, and a representative assembly.

The South's Great Progress in Foreign Trade

By Hon. Herbert C. Hoover, Secretary of Commerce

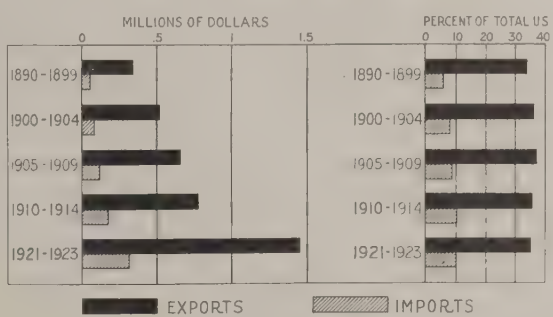
Our Southern states are favored by nature with a very extended coast line, affording numerous ports which give ready access to the sea. It is not surprising, therefore, that along with the agricultural and industrial development of the South during recent decades there has taken place a great increase in overseas trade through Southern ports. The figures are striking. The total exports and imports of the Southern seaboard customs districts from Baltimore on the north to Galveston on the south, together with the districts along the Mexican border, averaged annually during the past three years no less than $1,774,000,000, a sum greater than the total foreign trade of the United States in the average year of the last decade of the Nineteenth Century—a sum nearly five (4.7) times greater than the average annual trade of these same Southern ports during the average of that decade, and more than eight times greater than the average of these ports in the period from 1870 to 1879.

Herbert C. Hoover

Of course, alongside this marvelous progress of the South in foreign trade there has been great progress also in other parts of the country. The total exports and imports of the United States during the last three years averaged over four (4.3) times as great as during the average year from 1890 to 1899. The foreign trade of the Pacific Coast and of the northern border districts—the latter the result of the rapid development of Canada—has increased somewhat faster even than that of the South. The Southern ports have shown, however, more marked progress than the great ports of the North Atlantic seaboard. The share of the South in the total foreign trade of the United States increased from about 21 per cent in 1870 to 1879 and about 22 per cent in 1890 to 1899 to more than 24 per cent during the past three years.

This increase in imports through Southern ports is in part due to the increased consuming power of the South itself and in part to the growing importance of trade between the United States and the tropical and semi-tropical countries and islands to the south of its borders. This traffic from the Latin-American countries naturally finds a convenient channel through ports like New Orleans, Mobile, Tampa and Savannah. The imports of the port of New Orleans during the past three years have averaged more than eight times greater than during the closing years of the last century. Students of commercial geography have often pointed out that as the world becomes more evenly settled and developed, the currents of commerce will tend to be less between east and west and more between north and south, because the difference in climate means a permanent difference in the products, which calls for interchange. If this view is correct, the importance of the Southern ports as gateways of American commerce is likely to increase still further.

Foreign Trade Through Southern Ports



Appended is a table which shows the development of the trade of the principal Southern ports. The most striking figures in this table are those for Galveston (including Sabine), the annual total trade of which in recent years is more than twelve times as great as it was during the last decade of the Nineteenth Century. Galveston now is the second port of the United States as regards aggregate value of exports and imports, a phenomenon attributable primarily to the increase in the quantity and especially in the value of its cotton exports. The Virginia district shows an increase during the same period of nearly 500 per cent, and New Orleans (which is still by far the most important Southern port in import trade as well as in the variety of its exports) an increase of nearly 340 per cent. All three of these ports show rates of increase

Exports and Imports Through Southern Ports, 1870-1923

	Average Value			Per cent of United States Total		
	Total Trade	Exports	Imports	Total Trade	Exports	Imports
1870-1879*	$218,000,000	$178,000,000	$40,000,000	20.5	32.6	7.7
1880-1889*	237,000,000	210,000,000	27,000,000	16.4	27.5	4.0
1890-1899	378,000,000	335,000,000	43,000,000	21.8	34.4	5.6
1900-1904	588,000,000	515,000,000	73,000,000	25.0	36.0	7.9
1905-1909	767,000,000	656,000,000	111,000,000	25.6	37.8	8.9
1910-1914	944,000,000	774,000,000	170,000,000	24.5	35.7	10.1
1921-1923	1,774,000,000	1,459,000,000	315,000,000	24.3	35.1	10.0

* Figures somewhat too small, minor parts not included.

Although the exports through Southern ports are still more than four and one-half times as great as the imports through them, it is the imports which have shown the most marked rate of growth. Between the decade 1890 to 1899, and the period 1921-1923, the average annual exports through Southern ports increased 336 per cent and the imports 642 per cent. These ports handled 5.6 per cent of the total imports of the United States during the first period and 10 per cent of the total during the past three years.

GROWTH OF TRADE OF THE INDIVIDUAL SOUTHERN PORTS

(In round 1000 dollars)

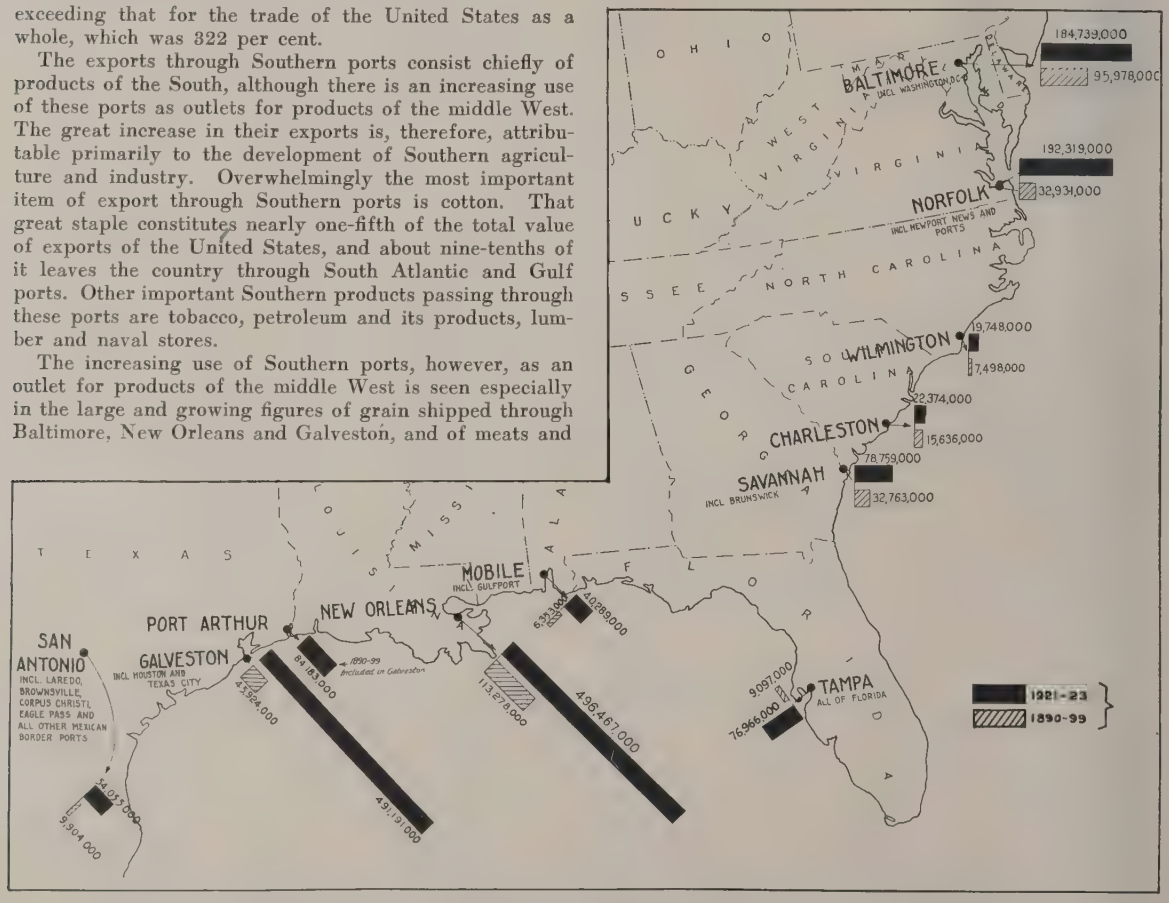
Custom Districts	Total 1890-99	Total 1921-23	Percent of increase	Exports 1890-99	Exports 1921-23	Imports 1890-99	Imports 1921-23
Maryland (Baltimore)	$95,978	$184,739	91	$82,721	$120,396	$13,257	$64,343
Virginia (Norfolk)	32,921	192,319	484	32,086	181,365	845	10,954
North Carolina (Wilmington)	7,498	19,748	163	7,350	12,404	148	7,344
South Carolina (Charleston)	15,636	22,374	43	14,746	16,427	890	5,947
Georgia (Savannah)	32,763	78,759	140	32,339	61,097	424	17,662
Florida (Tampa)	9,097	76,966	746	7,402	59,978	1,695	16,988
Mobile	6,353	40,289	534	5,649	37,200	704	3,089
New Orleans	113,278	496,467	338	97,170	359,247	16,108	137,220
Sabine (Port Arthur)	.....	84,183	1,152	.....	71,066	.....	13,117
Galveston	45,924	491,191		44,948	466,864	976	24,327
All Southern Districts*	$377,308	$1,774,267	370	$334,631	$1,459,418	$42,677	$314,849
United States total	$1,729,000	$7,299,000	322	$971,000	$4,161,000	$758,000	$3,138,000

* Includes besides districts listed the Mexican districts.

exceeding that for the trade of the United States as a whole, which was 322 per cent.

The exports through Southern ports consist chiefly of products of the South, although there is an increasing use of these ports as outlets for products of the middle West. The great increase in their exports is, therefore, attributable primarily to the development of Southern agriculture and industry. Overwhelmingly the most important item of export through Southern ports is cotton. That great staple constitutes nearly one-fifth of the total value of exports of the United States, and about nine-tenths of it leaves the country through South Atlantic and Gulf ports. Other important Southern products passing through these ports are tobacco, petroleum and its products, lumber and naval stores.

The increasing use of Southern ports, however, as an outlet for products of the middle West is seen especially in the large and growing figures of grain shipped through Baltimore, New Orleans and Galveston, and of meats and



TOTAL VALUES OF EXPORTS AND IMPORTS OF SOUTHERN CUSTOMS DISTRICTS, 1890-99 AND 1921-1923

other foodstuffs passing through the Florida gateways on their way to Cuba and other neighboring countries.

Attention has already been called to the fact that exports through Southern ports are still several times greater than the imports through them. This circumstance should not be misunderstood. It does not necessarily mean that the South sends vast quantities of goods abroad and receives very little from foreign countries. The character of the products of the South is such that they naturally move to the nearest and most convenient port, whereas the imported goods required by the Southern people are to a larger extent articles of high unit value in which the element of transportation is not a very important factor of cost, and which can consequently enter through any of our ports. It is, however, naturally the case that the South, as still primarily a producer of raw materials, exports these in large quantities, and that the proceeds are in considerable part used in the purchase of finished goods, not from abroad, but from our own more industrialized states. This triangular system of trade,

under present conditions, makes for the best interests of our country. Its ultimate welfare, however, will be promoted by further movement in the direction, already considerably advanced, of development of manufacturing industry in the South. This will mean ultimately a relative decrease in exports of raw materials from that section, but relative increase in its export of finished products.

A very considerable contribution to the expansion of the South's foreign trade must be credited to the rapid and far-reaching development of the railroads. Localities which not so long ago were inadequately provided with railroad facilities are now linked with efficient and flexible means of transportation. Interior points are well connected with the ports and extensive developments of the water terminals at the seaboard afford easy and economical outlets to foreign markets. World-wide steamship lines radiate from the South's Atlantic and Gulf ports, and these provide ocean transportation by both American and foreign flag ships. The ports which enjoy direct communication with virtually all of the major ports in foreign countries are Baltimore, Norfolk, Charleston, Savannah, Jacksonville, Tampa, Pensacola, Mobile, New Orleans and Galveston. The United States Shipping Board itself maintains steamship services between the South and all parts of the globe, and the exporter is thus assured of equitable transportation charges and fair treatment.

Fifty Years of Banking in the South

By Hon. D. R. Crissinger, Governor Federal Reserve Board

A study of banking in the South during the last half-century is very much the same as an examination of the whole marvelous history of the South's reconstruction after the Civil War. The South was not only materially impoverished by the war, but its entire industrial organization was destroyed and a new one had to be built on the ruins. When the enormity of this task is considered, it must be recognized that the restoration of the South is one of the marvels of community achievement.

D. R. Crissinger

To a very considerable extent, of course, the beginnings of industrialism were introduced during the war under the stress of urgent necessity. A community whose ingenuity and resources were equal to the task of transforming railroad machine shops into great munition factories and locomotive works, and which were able to produce the first iron warship, could well be expected to experience an enormous industrial development when its opportunity came. That opportunity was presented by the revival and diversification of Southern industry following the first period of after-war depression. The result has been the upbuilding, literally, of a New South in which industry has taken its place alongside agriculture; in which mining and metallurgical resources have been splendidly developed; in which hydro-electric development has played a vast part and is destined to play a still greater. This epoch has seen a growth in Southern-owned capital commensurate with the expansion in all directions; and, of course, the banking interests of the section reflect, in their splendid gains and sound condition, the general experience of the South.

During the past five decades the banking power of the South has grown at a rate almost twice as rapid as the increase in the aggregate banking resources of the nation. Of the present $54,000,000,000 of banking assets in the United States, the banks in the sixteen Southern states, including the border-line states of Maryland, Missouri and Oklahoma, now hold 16 per cent, or nearly $8,500,000,000. In the fifty years that have elapsed since 1873 the deposits of all the banks in the country have increased twenty-fold, while in this Southern section deposits have grown by almost forty-fold. A similar rate of growth, much more rapid than elsewhere in the country, has taken place in the number of banks serving these Southern states, so that present banking facilities are more widespread throughout the section and present banking power is greater than at any earlier time. This record of growth in Southern banking is a striking fact reflecting the increased agricultural, commercial and industrial activities in these states. Furthermore, as a result of the establishment of the Federal Reserve system a decade ago, the member banks of the Southern districts are in a position to avail themselves, to the benefit of their communities, of the credit and currency facilities of the Federal Reserve banks, and through them the credit requirements of Southern agriculture and industry are supported by the ultimate banking strength of the country. Thus, the increase in the number of banks and in banking resources has been accompanied by an improvement in banking organization, and credit needs arising both from the year-to-year growth and seasonal requirements are better provided for in the South today than ever before in its banking history.

Growth of Banking in the South

The extent of banking growth in the South and its distribution between National banks and those organized under state laws are indicated by the figures presented in the following table. For selected years, beginning with 1876, when accurate statistics for banks other than

Individual Deposits

Year	16 Southern States			Total United States		
	National	All other	Total	National	All other	Total
1876	$55,042,000	$105,145,000	$160,187,000	$641,433,000	$1,377,518,000	$2,018,951,000
1881	84,416,000	137,343,000	221,759,000	933,392,000	1,527,439,000	2,460,831,000
1909	766,436,000	961,601,000	1,728,037,000	4,824,823,000	9,181,812,000	14,006,635,000
1914	1,020,654,000	1,351,377,000	2,372,031,000	6,266,780,000	12,212,024,000	18,478,804,000
1919	2,204,871,000	2,754,085,000	4,958,956,000	12,368,816,000	20,727,433,000	33,096,249,000
1923	2,627,145,000	3,331,030,000	5,958,175,000	14,038,147,000	25,832,116,000	39,870,263,000

National are first available, the table shows the number and individual deposits of National and of all other banks in the sixteen Southern states and compares them with the totals for these items for all banks in the United States.

NUMBER OF BANKS

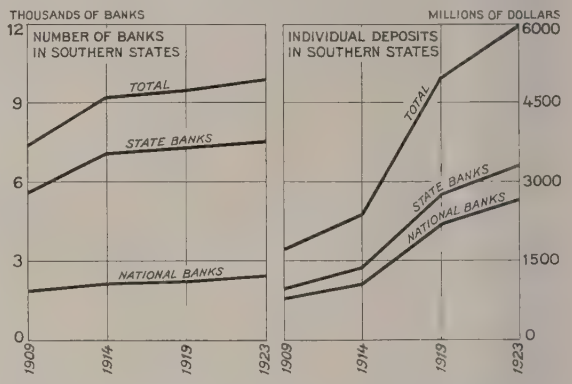
Year	16 Southern States			Total United States		
	National	All other	Total	National	All other	Total
1876.....	239	888	1,127	2,091	4,475	6,566
1881.....	238	769	1,007	2,094	4,681	6,775
1909.....	1,895	5,496	7,391	6,893	15,566	22,459
1914.....	2,108	7,099	9,207	7,520	19,203	26,723
1919.....	2,165	7,294	9,459	7,779	21,338	29,117
1923.....	2,371	7,483	9,854	8,236	21,876	30,112

In 1876 there were in the South in all 1127 banks, with total individual deposits of $160,000,000, as compared with 6566 banks, with individual deposits slightly in excess of $2,000,000,000 in the whole United States. A half-century later, after a growth of population in the South at about the same rate as in the country as a whole, Southern banks show both for number and individual deposits a rate of increase twice that for all banks in the United States.

RAPID DEVELOPMENT OF NATIONAL BANKING

A further fact brought out by the table is the more rapid development of National banking in its relation to other forms of banking in the South in contrast to the rest of the country. In 1876 National banks held about one-third of the individual deposits of banks in the Southern states, while in the country as a whole a little more than one-third of such deposits were in National banks. In 1923, however, the proportion of individual deposits held by National banks in the South had increased to nearly one-half, while for the entire United States the proportion had remained at about one-third. The increased importance of National banks in the South is also indicated by the more rapid growth in the numbers of National banks in that section in contrast with the situation elsewhere in the country. From 1876 to 1923 the proportion of National banks to all banks in the United States decreased from 32 per cent to 27 per cent, but during this same period increased in the South from 21 per cent to 24 per cent. One reason for this difference in the trend is the gradual diminution in importance in the Southern states of private banking which has attended the progressive enactment of better banking legislation. It is also generally true that, with the economic development of the country requiring larger units of financial organization, small private banks tend to disappear. Statistics of individual deposits show that for the entire United States the proportion of such deposits held by National banks increased from 32 per cent to 35 per cent, and that in the South the proportion increased even more rapidly, or from 34 per cent to 44 per cent.

The rate of growth in Southern banking, as measured both by the increase in the number of banks and in individual deposits, has been most rapid during the past fifteen years, at a time when the increase in the South has been roughly paralleled by a similar growth throughout the country. The period when the South was gaining most rapidly relatively to the rest of the country was between 1876 and 1909, but even for the period since 1909 total individual deposits in Southern banks increased by 240 per cent, while for the whole United States individual deposits increased by only 180 per cent. The improvement in banking statistics during this latter period makes possible a more detailed presentation of the character of banking growth in the South, and the chart shows, by five-year periods, the increase in the number and individual deposits of National and all other banks in the South. It shows graphically the rapid growth in individual deposits of both State and National banks since the organization of the Federal Reserve system in 1914. The more rapid growth in deposits than in the number of banks indicates the increase on the average in the lending power of Southern banks. Despite the rapid growth in



National banking in the South, to which reference has already been made, both in numbers and in individual deposits, the banks organized under state laws still bulk larger. In average size, however, the National banks in the South are about three times as large as banks other than National.

RELATION OF BANKING TO INDUSTRY

One test of the adequacy of banking in any section of the country is the ability of the banks to respond to the peculiar credit requirements of that region, and in consequence the underlying economic structure of a region largely determines the nature of its banking problem. In this respect the South differs from other regions by virtue of the peculiar credit necessities of its two most important crops—the raising of cotton and tobacco. Cotton, both in its relation to industry in the United States and to our export trade, is one of the most important commodities produced in the country. The history of its development is closely interwoven with the economic history of the South. The peculiar features of these crops which determine the nature of their credit needs are: (1) the widespread use of fertilizer, making a larger initial outlay and the consequent extension of credit by the fertilizer companies; (2) the Southern system of planter and share worker, involving the furnishing of seed and often equipment, as well as a drawing account credit for the share worker while the crop is being grown; (3) the large proportion of hand labor required at harvest; (4) the fact that both cotton and tobacco in their regions in the South are one-crop commodities; i. e., the prosperity of the region depends chiefly on the success or failure of a single crop; (5) the length of time involved in the seasoning of tobacco; (6) in the case of cotton, the extensive financing, making use of banking facilities in the Northern textile towns, the seaports, and often abroad, necessary to carry the crop until it is consumed. At each phase of this growing process credit forms an important factor. Fertilizer is furnished in the spring on credit, and is paid out of the proceeds of the crop. The crop itself is raised under a variety of arrangements involving a greater or less amount of credit to the grower. Frequently this involves the furnishing of land, quarters, implements, seed, animals and rations to the grower, all of them on credit, either directly from the dealer or indirectly through

the planter, but all to be liquidated when the crop is sold, while the profits are divided between the planter and the share worker. The fact that the work of the whole year proceeds only by means of a liberal use of credit, and is paid for out of the proceeds of a future crop subject to many hazards of weather and pest, indicates the vicissitudes of the Southern banker and the nature of his credit problem. In recognition of the importance of the problems of cotton financing, the Federal Reserve Board has made a special study of the methods used in financing the production and marketing of cotton, which was published in the Federal Reserve Bulletin during 1923 and is available in pamphlet form.

Among the other important Southern industries involving large credit needs are lumber, in the production of which the Southern states stand first; the recently developed and rapidly growing cotton manufacturing industry in North and South Carolina and other states; the coal mining industry of West Virginia and Kentucky and other states; the fruit industry in southern Florida; the iron and steel industry, with its southern center at Birmingham; the sugar industry in Louisiana, and the cattle industry of Texas. In spite of the large use of credit involved in these industries, however, the banking problems of the South and the peculiarities of its credit needs may be said to be largely determined by the cotton, tobacco and cattle-raising industries, according to the section in which they are conducted. Due to its three-year turnover, the credit problem of financing cattle presents many peculiar phases, while the system of tenancy in the tobacco and cotton districts involves a more widespread use of credit in the production of their crops than in other agricultural sections of the country. On the other hand, the Southern states in general have largely escaped many of the financial difficulties of the Western agricultural regions, because land values retained a greater relative stability in those regions and there has been less of a problem in connection with the financing of farm mortgages. The development of co-operative marketing organizations in the South has been rapid and vigorous, with the result that a portion of the credit needs are now supplied through these organizations by the banks in the larger money centers.

Federal Reserve System in the South

The relation of the Federal Reserve system to the banking situation in the South is indicated by the number of Federal Reserve banks and their branches in that region and the support which these Reserve banks have extended to the credit needs of the South. In apportioning the country into Federal Reserve districts, five out of the twelve Federal Reserve banks were placed in districts which serve the South either in whole or in part. Two of the Federal Reserve banks, Richmond and Atlanta, serve districts lying entirely within Southern territory, while practically all of the territory served by the St. Louis and Dallas banks and part of that served by Kansas City also falls within the Southern states. The Reserve system also maintains 11 of its 23 branches in the Southern cities of Baltimore, Birmingham, Jacksonville, New Orleans, Nashville, Louisville, Memphis, Little Rock, Oklahoma City, El Paso and Houston. The inauguration of the Federal Reserve system introduced a new epoch in banking. The advantages which it produced have devolved upon all sections of the country, the South as well as others. Over and over the advantages of more efficient collections, of reduced reserve requirements and vault needs, the new banking organization has already served the nation in times of stress, notably the early years of the war, the periods of the Government's war financing, and the 1920 and 1921 period of strain.

In ordinary times the Federal Reserve banks play an important role in assisting member banks to meet the seasonal demands for credit and currency, through the rediscounting facilities it extends to member banks, and by furnishing an elastic currency. This feature of Federal Reserve bank operations is particularly important in a region where seasonal changes in credit requirements are so marked. An added element of strength furnished by the Federal Reserve system is that in emergency times and in periods of strain, such as 1920 and 1921, when local banking strength is not adequate to meet the unusual demands, the Federal Reserve banks of one district may, if necessary, meet local requirements by borrowing from other Federal Reserve banks. The extent to which the Federal Reserve banks of Richmond, Atlanta, St. Louis and Dallas during the peak of their credit demand in 1920 made use of the credit obtained through rediscounting with other Federal Reserve banks is indicated by the fact that at the middle of October, 1920, these four banks, which were extending in the aggregate to their member banks over $637,000,000, were in turn borrowing from the Reserve banks of other districts more than $134,000,000. Thus, one dollar out of every five which these four Southern Reserve banks were extending to meet the local demands for credit was obtained from outside their districts. In this way the combined strength of the Reserve system came to the assistance of the South in time of need. This shows the vital importance in those years of the assistance received from the Reserve banks outside of the South.

Membership in the Reserve System

It is important, in considering the relation of the Federal Reserve system to banking in the South, to bear in mind that the point of contact between the borrowing public and the Reserve system is at the counter of the member bank. The number and character of these points of contact, therefore, depend upon the extent and distribution of membership. Taking the sixteen Southern states as a whole, 30 per cent of the total number of banks are members of the Federal Reserve system, and these banks hold about 64 per cent of the total banking resources of the section. The proportion of banking included in the Federal Reserve system, measured either by numbers or by resources, is about the same for the South as for the whole country, but there is a striking variation as among the several Southern states. The following table shows the percentage of banking resources held by member banks in each of the sixteen Southern states:

Proportion of Total Banking Resources Held by Member Banks in Southern States on June 30, 1923

	Per cent of total resources of member banks to all banks.		Per cent of total resources of member banks to all banks.
Alabama	74.2	Missouri	65.2
Arkansas	59.8	North Carolina	54.1
Florida	59.4	Oklahoma	81.4
Georgia	68.5	South Carolina.	53.6
Kentucky	65.9	Tennessee	60.9
Louisiana	67.0	Texas	81.1
Maryland	43.2	Virginia	71,8
Mississippi ...	31.6	West Virginia..	54.4

It will be noted that the proportion of banking power inside the system ranges from over 81 per cent in Oklahoma and Texas to as low as 31 per cent in Mississippi. Non-member banks are, on the average, much smaller than member banks, so that in Louisiana, for example, non-members are 82 per cent of all banks, but hold only 33 per cent of total banking resources. Taking the South as a

whole, non-members constitute 70 per cent of the total number of banks, but hold less than 35 per cent of the total resources.

A joint committee of Congress during the past year has inquired into the reasons why a larger number of banks have not joined the system. The attitude of the Federal Reserve Board toward the desirability of a growth in membership is indicated by its statement that "larger membership in the Reserve system would undoubtedly increase its usefulness by enabling it to reach more directly a greater number of banks, particularly in the rural communities. Since the addition to membership of the smaller rural banks, however, would add little to the reserves of the system, while it would increase its responsibilities, the desirability of their admission rests not upon their contribution to the strength of the system, but upon the fact that through their admission the benefits of the Reserve system would be more widely distributed. The strength and effectiveness of the Federal Reserve banks is not dependent upon increased membership, and the desirability of further growth arises from the advantages of membership to the banks that join and to the communities which they serve." It is through an increase in membership of Southern banks that the borrowing communities of the South may more fully share in the advantages of a better organization of banking made available by the Federal Reserve system.

One advantage of viewing the financial development in the Southern states in historical perspective is that it permits a clearer picture of the forces at work shaping the future of the South. The rapid growth in recent years has been accompanied by increased industrial and manufacturing activity, and it is in this direction that further development has great promise. Power, in abundant quantity and at reasonable rates, has always been a determining factor in the location of manufacturing industries. The South has made progress in the utilization of its hydro-electric power and it has great potential development as a basis for economical production. Further expansion and diversification of industrial enterprises will bring a larger volume of trade and commerce. These will require investment of capital and still larger banking resources, and will at the same time furnish a broader base for credit extension. It is reasonable, therefore, to expect during the next decade a continued growth in the banking facilities of the South.

Banking Before the Civil War

From "Southern Sidelights," a Picture of Social and Economic Life in the South a Generation Before the Civil War, by Edward Ingle, published many years ago, the Manufacturers Record takes the following interesting extracts

"The South shared in the results of the removal of the Government deposits from the United States Bank in 1833-34. Banks in Baltimore, Washington, Richmond, Raleigh, Charleston, Savannah, Augusta, Mobile, New Orleans, Louisville, Nashville, St. Louis and Natchez were among the 36 depositories selected by 1836. On March 1, 1837, of 90 deposit banks and branches in the United States, 29 were in the South. The speculation in lands that followed, the inflation of currency, the increase in the number of banks adding their paper to the bloated fund and the wild extravagance that prevailed were not confined to any section.

"Mississippi banks of that period acted as cotton factors.

"In Florida, still a Territory, the Union Bank was incorporated with a capital of $300,000, derived from the sale of territorial bonds. and the lands and slaves of its stockholders were hypothecated as security.

"Louisiana lent its credit to banking corporations whose capital stock was secured by mortgages upon real estate.

"In 1836, a short time before the crash, of 677 banks with 146 branches in the United States, 155 with 121 branches were in the South, and the speculation in Western lands and Eastern real estate in cities had a counterpart in Mobile, where, with slight changes in population, the value of real estate was elevated from $4,000,000 in 1834 to $18,000,000 in 1837. The price of cotton, too, rose rapidly from 11½ and 13½ cents in 1833 to 18 cents on January 15, and 20 cents on July 17, 1835.

"The disasters of 1837 fell upon the country, but in the subsequent collapse of 1839, following the second suspension of specie payments by the United States Bank of Pennsylvania, Southern banks were the chief sufferers. Of its 233 banks, 201 suspended entirely or partly and 10 were broken. Of the 723 in the rest of the country, 204 suspended and 46 were broken. By 1840, 48 banks in the North and 4 in the South had resumed business.

"The relations of the state to the banks were disastrous in some instances for both, notably in Arkansas and in Mississippi, where was nursed, if not born, the idea of state repudiation of obligations. When in 1841 Governor McNutt suggested that the Union Bank be placed in liquidation and that the bonds issued by the state as its working capital be repudiated as illegal, the legislature resolved that:

" 'The insinuation that the state of Mississippi would repudiate her bonds and violate her plighted faith is a calumny upon the justice, honor, and dignity of the State.'

"But the next legislature deemed that the state was under no moral or legal obligations for the bonds.

"The effects of the panic were partly seen in the constitutional legislation of Southern states. Texas in 1845 and Arkansas in 1846 prohibited banks. Louisiana in 1845 decreed that no corporate body should thereafter be created with banking or discount privileges, but in 1852 that provision of the Constitution was modified to the extent of providing that no aid should be given by the state to banks, but that they might be created with arrangements for the registry of all bills and notes, and ample security for specie redemption. Ten years before, though, a banking law had been passed which not only carried the banks successfully through the panic of 1857 and made them rank second in the country in specie holdings in 1860 and fourth in the amount of capital, but which contained features afterward embodied in the National Bank Act. Missouri provided in 1855 for the establishment of a definite number of banks upon a specie basis, and three or four states in the South adopted the New York free-banking principle with modifications.

"Misfortunes of foreign countries and the good fortune of the United States after 1845 increased the facilities for banking, particularly between 1850 and 1860, and the South shared in the revival.

"Occasionally the statement was made that commerce and manufacturing were impeded by the inability or the unwillingness of some Southern banks to aid local enterprises. It was said, for example, that Richmond banks would discount drafts upon New York in preference to local paper. Of course, this was because the exchange between the North and the South was in favor of the former—as much as from 7 to 40 per cent, it was estimated in 1838—but a Virginian who wrote to Governor Wise on the subject did not think that the immediate benefit to the banks equaled the ultimate loss to the community.

"Citing the case of a manufacturing company compelled to draw upon its New York consignee, and thus to run the risk of being obliged to sell at a loss, he said: 'Ruin of the company and loss to the city is thus clearly traced to the action of the banks, placing the whole manufacturing industry at the mercy of the New York accepter. And all this is done for the purpose of making a little premium on exchanges and because some of the old directors think this mode of banking is the only legitimate and safe mode, for no reason in the world except that it is the old accepted plan of banking. It is in vain to say that the banks refused to discount the home paper first offered in the case just cited for want of funds. This is disproved by the fact of their giving the company money upon the Northern drafts. The New York merchants advance nothing but their names. The money is advanced by the Richmond bank, and before the drafts become due the goods consigned are sold to meet them. The merchant in New York, with little or no capital, is thus enabled to carry on a large business; and, while lending his name as accepter to one firm, he may be lending his name to hundreds and thousands scattered over the South, and thus, without advancing one cent and by the exercise of proper caution, he may become a large capitalist by means of credit given him by the banks of the South.'

"Again, it was pointed out in 1850 that New Orleans had not sufficient banking capital to handle the produce that came to it. It was said that only $10,000,000 were available to carry $96,000,000 worth of produce, while New York, Boston and Philadelphia, with $59,000,000 capital, shipped $45,000,000 worth. The consequence was that men of the upper Mississippi could get better prices for their produce in New York, and, on the other hand, could be accommodated with longer credits for their purchases.

"Conditions improved during the next few years for New Orleans and for other Southern cities. In 1855 Baltimore had 13 banks, with $8,471,796 capital; Richmond 3, with $2,114,000; Charleston 9, with $10,756,735; Savannah 5, with $3,041,190, and New Orleans 8, with $14,702,600. At the same time Boston had 37 banks, with $32,400,000 capital; New York 52, with $48,482,900; and Philadelphia 15, with $10,618,000."

The South's Development From the Shipping Viewpoint

By L. C. Palmer, President Fleet Corporation, Washington, D. C.

The early history of our nation is inseparably associated with sailors, shipbuilders and the seafaring fraternity in general. Most of the settlers of the Southern colonies, the Carolinas, Virginia and Maryland, trace their ancestry back to the world's most enterprising seafaring stock.

It is not surprising that, without exception, the early settlements in the South clung closely to the seaboard. While the forests abounded with game and the fields were abundant in fertility, nevertheless the sea insured to the pioneers their only certain source of food until the harvesting of their first crops. The sea likewise represented to them their one direct road to home, and their safe refuge, as it were, in the event of an overwhelming onrush of the savage redmen against their primitive and poorly defended habitations.

L. C. Palmer

Speaking generally, the great highways of the world are traced by nature on the seas, where they facilitate and expedite communication between the nations of the globe. The navigation of the seas, therefore, is of interest not alone to the nations which carry on foreign commerce through their own ocean ports, but because of the interdependability of one part of the world upon another for the necessities and luxuries of life it is of importance to all mankind.

The development of our civilization and the growth of civil law, founded as it is largely upon natural law, has caused us to recognize certain basic and fundamental property rights of the individual upon the land, which rights are among the fundamentals of our conception of government of today, as distinguished from the primitive communistic theory of ownership of early history.

In contrast with these land rights is the free and unrestricted use of the seas, of the so-called maritime highways of the world, which is today generally conceded to be the natural right of all nations, for the reason that any number of vessels may proceed to their destination without impeding the course or obstructing the way of each other.

It is true that in ages past first one country and then another struggled for the domination of the seas and the control of sea-borne commerce. The nations of the Old World—those which had attained eminence and power—possessed as a necessary support to the maintenance of their supremacy large and powerful fleets which played important parts in their growth and success.

While, in many instances, these fleets were devoted almost entirely to war and destruction, nevertheless other nations have grown to greatness through the utilization of their vessels for commerce and trade, notably the Egyptians and Phoenicians. The primitive boats of the early Phoenicians traveled far from their own Mediter-

ranean shores seeking raw materials which those people so skillfully welded into the manufactures of that time. While Phoenicia was a small and comparatively unimportant country on land, its vast fleet enabled it to become the dominant power of its day.

As we approach the Middle Ages, vessels and ventures grew in size and reached out farther and farther from their home shores, seeking new lands and new opportunities for commerce. The vessels of this time continued to embody the combined characteristics of trade and war, and even as late as the Sixteenth Century seagoing trading vessels during times of peace carried guns for their defense against the pirates which infested the seas.

Later, as both commercial and naval activities became more specialized and better organized, and as piracy disappeared, the distinction between trading vessels and war vessels became more and more marked until they assumed radically different types, and the commercial fleets finally came to depend upon purely naval forces for their protection. But the mercantile fleet has been, and probably will continue to be, an essential auxiliary to the naval fleet.

Since the Middle Ages, Spain, Holland, France, Great Britain and Germany have each sought and, for a time, controlled largely the maritime commerce of the civilized world. In the early days, and even as late as the Eighteenth Century, it was held that one country could grant the sea to another as it could cede its landed territories. While this doctrine no longer holds, the ambition to control as great a share of sea-borne commerce as is consistent with the preservation of peace still persists in the policies of nations.

Even after the United States had attained her independence, the shipping policy of Great Britain still conformed to the spirit of the laws of Edward III, as strengthened by Elizabeth, Cromwell and Charles II, which laws had become, in fact, so restrictive that it was practically impossible for other countries to participate in the carrying trade of the world.

However, the commercial urge of our new nation, the possession of vast forests adjacent to our seacoast and the ingenuity and skill of our people enabled us, before the close of the Eighteenth Century, to produce better and cheaper ships than those of our British forebears and to operate them in successful competition on the trade routes of the world.

While history accords to New England a more prominent part in the early development of the shipping industry of our country, the growth of the shipping and its allied trades in the Southern states was both early and material, particularly in respect to the coastwise traffic and the interchange of products between the West Indies and the south coast settlements. In the early days many small ships were built in Southern ports and many sailed for Britain, Spain, Portugal and the Mediterranean, loaded with the chief colonial staples of the time—sugar, rum, cotton and tobacco. Not only was their cargo prized for its value, but the ship itself was often sold upon its arrival in European ports, for the colonial vessels had acquired a fame for superior design and construction.

Advancing from colonial days to the period after the Revolution, we observe in the early part of the last century the growth in influence of the South in the shipping affairs of the nation. In the early forties, a prominent Senator of Georgia, Thomas Butler King, began a very able propaganda in support of national assistance to the upbuilding and maintenance of an American merchant marine. The movement was assisted by another able Senator from the Southern states, Thomas J. Rust of Texas, who advocated an annual appropriation of $1,000,000, a large sum in those days, for the purpose of providing for the carriage of foreign mails in American ships.

This first-mentioned Southern statesman and patriot, Senator King, early recognized the need and importance of the development of our merchant marine, and directed attention forcibly to the threatened competition of the British ships and their monopolization of overseas commerce in a statement advocating a national subsidy.

"It is sufficient to show," said Senator King, "that they (the British statesmen) are resolved, as far as practicable, to monopolize the intercourse between these two important points. This movement shows clearly that the time has arrived when we must decide whether we will yield this essential branch of navigation, and this indirect means of extending our naval armaments, to our great commercial rival, or whether we shall promptly extend to our enterprising merchants the necessary means to enable them to bring American energy, enterprise and skill into successful competition with British sagacity and capital. Of all the lines of sailing packets which cross the Atlantic, not one is owned in Europe, and it is not to be doubted that American merchants, properly encouraged, will assuredly excel in them (steamship lines), as they have done in sailing vessels; and when we reflect that this may be accomplished to the mutual advantage and advancement of our commercial and military marine, it would seem that no statesman ought to hesitate for a moment to give his support to a measure which is demanded alike by prudence and the necessities of our position."

The Ocean Mail law of 1845, and the supplementary law of 1847, provided for the construction of four large war steamers, as well as for five merchant steamers, to carry the mail to Havre, Bremen and Liverpool in Europe, Havana and Panama in Central America and from Panama north to California and Oregon.

President Polk, a Southerner and a Democrat, in a speech before Congress on the subject of the merchant marine stated:

"The enlightened policy by which rapid communication with the various distant parts of the world is established, by means of American-built steamers, would find an ample reward in the increase of our commerce, and in making our country and its resources more favorably known abroad; but the national advantage is still greater —of having our naval officers made familiar with steam navigation, and of having the privilege of taking the ships already equipped for immediate service at a moment's notice, and will be cheaply purchased by the compensation to be paid for the transportation of the mail, over and above the postage received. A just national pride, no less than our commercial interests, would seem to favor the policy of augmenting the number of this description of vessels."

The marine subsidy policy advocated by the two distinguished Southern Senators produced early and effective results. Begun in 1847, within eight years the tonnage of the American ocean steam fleet had grown from 5631 to 115,045 tons. Starting from a point far behind our great competitor, England, in that short space of time we had produced a total tonnage which compared favorably with that of Great Britain, and, ship for ship, our steam vessels were much superior.

The breaking out of the World War and the creation of the Fleet Corporation resulted in the following construction of ships in Southern yards:

Alabama—At Mobile, wood, 50,000 tons; steel, 200,000 tons; wood and steel, 40,000 tons.

Florida—At Apalachicola, Bagdad, Carrabelle, Cleveland, Daytona, Fernandina, Fort Myer, Jacksonville, Key West, Millville, Milton, Pensacola, Punta Gorda, South

Jacksonville and Tampa, wood, 107,000 tons; steel, 150,000 tons; wood and steel, 100,000 tons.

Georgia—At Brunswick, Darien, Port Wentworth and Savannah, wood, 170,000 tons; steel, 200,000 tons; wood and steel, 100,000 tons.

Louisiana—At Algiers, Berwick, Hodge, Madisonville, Morgan City, New Orleans, Patterson, Plaquemine, Slidell and West Lake, wood, 40,000 tons; steel, 10,000 tons; wood and steel 10,000 tons.

Mississippi — At Biloxi, Gulfport, Handsboro, Moss Point, Pascagoula, wood, 281,000 tons.

North Carolina—At Elizabeth City, Morehead, New Bern and Wilmington, wood, 14,000 tons; wood and steel, 110,000 tons.

South Carolina—At Beaufort, Charleston, Georgetown and Mt. Pleasant, wood, 11,000 tons; steel, 100,000 tons.

Texas—At Beaumont, Galveston, Houston, Orange and Rockport, wood, 357,000 tons.

Since the war the commercial requirements of the South have been given due recognition through the establishment of steamship lines on such of the trade routes between Southern ports and the principal foreign-trade regions as were not adequately served by private American lines, and it is the purpose of the Fleet Corporation, which operates these lines through the medium of private managing operators, to develop them to the highest practicable efficiency and place them on a permanent footing. To this end there has been effected recently a reorganization of the lines through the consolidation of overlapping and competitive services and the formation of more economical and businesslike organizations.

The expected improvements in economy and character of service are already being realized. There has been a reduction in the time of ships' voyages, with consequent saving in operating expenses; more efficient organizations for securing freight have been created, and greater flexibility of operations has been made possible.

Beyond the immediate purpose to improve the lines for sake of economy and efficiency, and to keep expenses within the limits prescribed by a reduced budget, the Fleet Corporation is guided by the further purpose, in accordance with the Merchant Marine Act, to make the lines as nearly as possible self-supporting with a view to their disposal ultimately to private ownership. If we can develop them to the point where they will appeal to operators as a good business investment, we will have accomplished what was evidently the desire of Congress.

Beyond question, our people want an adequate merchant marine, one adequate for national defense as well as for commerce; but they want a real one, with the definite prospect that within a reasonable time it will become self-sustaining or so nearly so that, whatever direct or indirect aid may be necessary to make up for the handicaps under which it competes with foreign shipping, such aid will be within reason.

In order to convince shippers at home and abroad that we are in the business to stay and that our services are reliable and worthy of their patronage, the lines must be run in a strictly business fashion. Formerly, shippers were more or less justified, perhaps, in declining to give our vessels the greater share of their shipments, as there were many indications that our fleet was being operated in an unbusinesslike manner and that it had none of the attributes of permanency. We are now in a position to convince shippers and travelers that our services are the equal of our competitors, and that it is to their interest to use American flag ships. As shippers learn that our lines are being managed in a businesslike manner, there will be less necessity to appeal to their patriotism for the support of American ships.

It was next to impossible to make constructive deductions from our operating performances on the various routes as long as our vessels were not effectively disposed over the routes and as long as operations were not conducted economically, but with the improvements effected it should be possible in the near future to determine quite accurately the differential that exists between the operating costs of our own and foreign ships. In other words, it will be possible for the first time to appraise the value and the prospects of our lines.

As the economic results of our reorganizations are realized and as traffic conditions improve, so that our revenues will more nearly meet operating expenses, the services can be gradually expanded to meet additional demands.

The efforts of the Fleet Corporation are being directed not only towards the improvement of the lines, but also to all matters in which it finds opportunity for increased efficiency with reduction of expenses. In the past eight months the annual payroll of the Corporation has been reduced by more than half a million dollars; stevedoring costs have been materially reduced, and important economies in fuel have been realized, largely through the education of personnel and the institution of a system of competition. Improved methods of handling collections and disbursements at foreign ports have eliminated large losses in foreign exchange. Most important of all, perhaps, is the improvement effected through the establishment of a budget system which now governs disbursements in accordance with the usual business practice. In short, the operation of the Government fleet has been placed on a business footing, and is now operating under all the controls and checks of an efficient commercial organization.

Why the West Was Settled

Some years ago a land operator took a party of Western people to the South to show them some large timber property. As they passed through Chicago a blizzard and snowstorm was raging and the next morning they had passed beyond the region of the snow and ice and saw signs of vegetation. A little later they saw the leaves bursting forth and the birds singing and all nature was radiant in the brilliant, gorgeous early spring day. One of the party, turning to the land operator, said, "My friend, I do not believe any of your stories about the wealth of timber, of coal and iron in the South." "Why not?" was the reply. "Because," said the Western man, "if the South had all of these advantages and this climate added to them, how can you explain why it is so sparsely populated as compared with the crowded West?" The answer was "that was a plan of the Almighty. He knew that if the people who had settled the West had understood the resources and advantages of the South they would never have gone West and so He permitted those millions of people to crowd into the West before the world at large was given the opportunity of knowing the wonders of the South."

Importance of Farm Woodlands

Forest lands held by farmers in the Southern states constitute a total of about 124,000,000 acres, which is more than one-third (35 per cent) of all the farm lands of that section. Farm woodlands represent more than one-half of the entire forest land in the South, including the great holdings of the lumber companies, and yield annually about $94,000,000 worth of timber products. Nearly one-half is sold in the form of logs, other cut products and as standing timber. The remainder is used on the farm.

Secretary Wallace on Agriculture in the South

*An Exclusive Interview With Secretary of Agriculture Hon. Henry C. Wallace**

It is impossible to foretell the agricultural future of a region merely by listing its natural advantages of soil, climate and nearness to market. Agriculture cannot flourish without such advantages, but these do not insure prosperity. They are sterile unless fertilized by human energy and brains.

This is particularly true of the South, where conditions make the problem of profitably utilizing land resources difficult. The South is coming to realize this fact. Proof is furnished by its vigorous grappling with the boll weevil scourge, and by its recent great progress in fruit and vegetable growing, dairying and livestock raising.

Henry C. Wallace

Any enumeration of the agricultural resources of the South which left its people out of the reckoning would be inadequate. Farmers in all the Southern states are showing a keen interest in soil improvement, in crop rotation and in scientific farm management. This appreciation of the possibilities of up-to-date methods is an "agricultural resource" which cannot be measured statistically, but which, nevertheless, may be of more practical importance than many things that can be accurately appraised.

In the cotton belt easily the most encouraging aspect of the present situation is the way farmers are tackling the problems created by the boll weevil. As everybody knows, the boll weevil now covers practically all the cotton belt except the sub-humid section in northwestern Texas. No entirely satisfactory means of control has been discovered. Poisoning can be done profitably only on fertile soils where the yield is ordinarily one-half bale or more to the acre. Over a great part of the cotton belt the problem of maintaining production on a profitable basis is acute.

As the South produces nearly two-thirds of the world's cotton, the inroads of the boll weevil have caused the price of cotton to go up about as fast as the production has gone down. Temporarily, therefore, the effect of the pest has been mitigated. But the high price of cotton has stimulated other countries, particularly the British colonies, to enlarge their cotton acreage, and the outlook is for keener competition in the world's cotton market. Obviously, the cotton belt has a serious problem to solve.

Yet, experts best fitted to judge the outlook take an optimistic view of it. And they base their optimism primarily on their belief that the Southern cotton grower, in his fight to retain his place in the world's cotton market, will have a decisive advantage over his foreign competitors because of his greater intelligence, his readiness to accept the aid of science and his superior resources. The South is learning to control the weevil. Risk of serious foreign competition is not imminent, and by the time it becomes acute the South will probably have developed means to meet it by the cultivation of standard improved varieties of cotton only and by improved methods of production in general.

There is certainly no need for undue alarm over foreign cotton growing. Cotton growers everywhere have to deal with pests. In some countries, as in the British possessions in Africa, they are handicapped by superstition. When the British agricultural expert, growing cotton for demonstration purposes in a plot surrounded by native plots, gets three times the yield the native gets, he is credited with supernatural powers. Our people need not worry about the competition of cotton-growing areas where such ideas prevail.

In their fight against the boll weevil, American cotton growers are using more intensive methods of culture and more fertilizer. They are building up soil fertility. With the aid of scientific workers they are seeking economically effective means of killing the pest by poison, which is applied commercially as well as in an experimental way in the form of dust and liquid. Growers are trying to "beat the weevil to it." They are planting earlier-bearing and more rapid-fruiting varieties of cotton, and adopting cultural methods intended to make the plant grow off faster and set the proper amount of bolls per acre for a crop in the shortest time. Many farmers pick up the punctured squares and thus lessen the crop of maturing insects. Here is proof that the South knows what it is up against and is squarely facing its problem.

Some parts of the South have been obliged by the ravages of the boll weevil to turn from cotton to other crops. Nevertheless, cotton will certainly remain the dominant farm enterprise of the purely cotton-growing sections of the South. It still far overshadows all other farm enterprises. In 1919 it occupied 41 per cent of the crop land in the cotton belt and constituted 50 per cent of the value of all crops. Our cotton belt is about 1400 miles long and varies from 125 to 500 miles in width. Its area is 276,000,000 acres. Moreover, the area of improved land in the cotton belt could probably be doubled if the price of farm products justified the expense of clearing and cultivation. In spite of the weevil, in any ordinary season the South should have no difficulty in producing a cotton crop ranging from 11,000,000 to 14,000,000 bales, and will doubtless do so as long as prices make it profitable. While the cotton belt can do that it is idle to talk of the decline of American cotton growing.

But, if cotton is the chief source of farm income in the South, it is by no means the only source. In many sections corn occupies an area equal to that of cotton. The corn acreage of the belt as a whole is 70 per cent of its cotton acreage. Corn is the principal feed and food crop. Though it cannot be produced for shipment to outside markets in competition with the corn of the corn belt, it is grown profitably for local consumption and is a great help to the expanding livestock industry of the South.

In some parts of the cotton belt considerable quantities of oats, wheat, rye, cowpeas, soy beans, peanuts, sweet potatoes, Irish potatoes, velvet beans, sorghum, and fruits and vegetables are grown. Tobacco in the Carolinas and peaches in central counties of Georgia, in eastern Texas and in Arkansas are important sources of income. Winter

* This is probably the last thing ever issued for publication by Secretary Wallace. It was written under a great pressure of work and sickness and, as it could not be as complete as Mr. Wallace desired, he asked that it be published under the statement of an "Exclusive Interview."

vegetables, early potatoes and sweet potatoes are grown in Florida, southern Georgia, southern Alabama, North and South Carolina, around New Orleans, and in southern Texas. The legumes, notably velvet beans, soy beans and vetch, are increasing in importance.

Commercial vegetable growing on a large scale in the Southern states has developed mainly within the last 25 years. It has been expanded to include all the important vegetable crops. Total production is now enumerated in thousands of carloads. This development, resulting mainly from increased demand in large consuming centers of the East, was made possible by improved refrigeration and transportation facilities. Southern growers are now supplying distant markets with tomatoes, beans, peppers and lettuce and many others throughout the year.

Florida ranks among the states having the largest acreage devoted to vegetables. It is third in the list of states in the value of its commercial vegetable industry. An interesting sidelight on the importance of the Southern vegetable industry is the fact that the region has more than 3000 sweet potato storage-houses.

An inventory of the fruit of the South would make a long and varied list. It would represent many millions of invested capital and millions in the annual values of the crops. In valuation of annual production, the orange is first and the peach second. It is difficult to estimate the relative importance of the other fruits. It may be worth while to mention a few of them. The South successfully grows grapefruit, limes, lemons, apples, pears, plums, Japanese persimmons, figs, pineapples, pomegranates, bananas, kumquats, mangoes, avocados, grapes, strawberries, dewberries, blackberries, blueberries, guavas, custard apples, pond-apples, cherimoyas and sapodillas. Some fruits could be grown much more extensively with profitable results. There seems to be an opportunity for greater production of muscadine grapes. The same may be said of Japanese persimmons. The fig, popular and common though it is in the gardens and about the buildings of the South, has not developed into an industry of large size.

It would be easy, however, to overestimate the opportunity for expansion of fruit and vegetable growing in the South. All the fruit crops of the country in 1919 occupied only about 2 per cent of the crop area. They constitute only about 7 per cent of the value of all crops. A slight expansion in the acreage might easily oversupply the market. But even if it were practicable to double the fruit and vegetable acreage of the South, the operation would only bring under cultivation less than 1 per cent of the acreage of forest and cut-over land of the region.

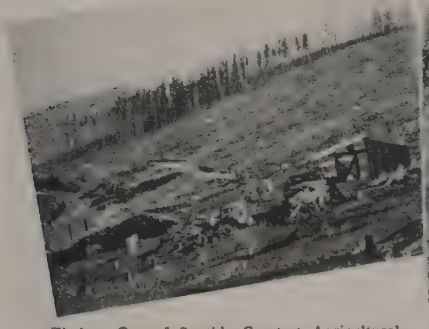
Much greater opportunities lie in the development of the livestock industry. There has been remarkable progress in this direction in the last few years. Dairying has gone ahead faster than the raising of beef cattle. According to the census, there were 5,500,000 dairy cattle in the cotton belt in 1920, compared with 4,500,000 beef cattle. This livestock development is one of the good results of the boll weevil scare. Thousands of farms that formerly raised only cotton are today in a prosperous condition

Southern Boys Are Being Taught the Art of Seed Corn Selection by Agricultural Extension Agents as One Means of Anchoring this "King" of Crops in the South

as the result of experiments in raising dairy cattle, beef cattle, poultry and hogs.

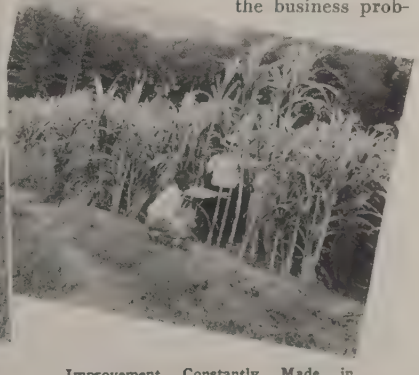
A combination of the cow, the hog and the hen with general farming has given good results in the South. The value of creamery butter produced in the Southern states east of the Mississippi River amounted last year to over $25,000,000. In the sub-tropical, Gulf and south Atlantic coastal belt, although only about 8 per cent of the area is in pasture, beef-cattle raising is one of the most important farm enterprises. Beef cattle in 1919 constituted 55 per cent of the total animal units of the region. This is about the same proportion as in the great plains region of the West.

Livestock production could be expanded considerably more in the South with advantage, although the business prob-



Timber, One of South's Greatest Agricultural Assets
Proper Conservation Efforts to Utilize More Land for Forest Needed

Care in Production and Marketing Greatly Enhanced Aggregate Value of South's Fruit Crops



Improvement Constantly Made in Quality of Sugar Cane Crop of South. One of Its Important Commercial Products

ably could not be safely carried to the point where surplus production would have to be disposed of in outside markets. Production of livestock in the South for local consumption is protected against the competition of the North by what amounts practically to a tariff in the shape of high freight rates. This protection would disappear should the South produce a surplus of livestock requiring shipments to outside markets. In that event the high freight charges would act as an export tax. But the South is still a long way from that point. It imports large quantities of meat products from the middle West. Development of the Southern livestock industry to the point of local self-sufficiency would be clear gain.

Today the number of livestock in the South, in proportion to the population, is below the number for the United States as a whole. A million and a half more beef cattle are needed in the South to bring the ratio of cattle to population up to the average for the United States. There is needed not only an increase in the quantity, but also improvement in the quality of the livestock of the South. It is fair to say, however, that there has been a great gain in the quality of Southern farm animals in the last decade, with the result that in 1920 the census showed 11 cotton-belt states to contain one-fifth of the registered purebred hogs of the country, and nearly one-seventh of the registered purebred cattle.

Where the Southern livestock raiser is behind the livestock man in other parts of the country is in his use of pasturage, hay and forage crops. The South has large unused pasturage possibilities. Its present improved pasturage is less than 6 per cent of the total acreage in farms. In many counties the area of improved pasture is less than 2 per cent. Although more than half of the crop land of the cotton belt was devoted to producing feed for livestock in 1919, the value of its feed crops was only one-fourth of the value of all its crops. This does not compare well with the showing in the corn belt. In that region 84 per cent of the crop land produced feed for animals, and the value of these crops was 80 per cent of the value of all crops. The truth is that the South, although possessing millions of acres of cheap grazing land, has given little thought to producing feed for livestock.

There are signs, moreover, that the South is waking up to its neglected opportunity for pasturage development. Cattlemen are coming to realize that good pastures are necessary to successful cattle raising, and that Southern pasture lands can be greatly improved. Experiments have shown that Bermuda grass can be successfully grown on the good land, and Japanese clover and carpet grass on the poor lands of the South. Farmers are learning that the common practice of burning over poor pasture lands to encourage the growth of native grasses defeats its own purpose, and that when fires are controlled and pastures closely grazed good growths of carpet grass and lespedeza tend to displace the native grasses on the better soils.

Another great opportunity for the South to increase the value of its livestock might be found in a more aggressive warfare on animal parasites. Both cattle and hogs in the South are afflicted with many parasites. The cattle tick, which disseminates Texas fever, is gradually being eradicated. But many other diseases remain to be controlled. Infestation is more serious than in the North, because the mild climate enables the eggs, or larvae, of worms to live in the ground from year to year. The raising of high-class stock and keeping animals free from diseases in the South demands vigilance. Methods, however, have been devised making it possible for this to be done, provided the region is willing to pay the price.

That most of this region is willing to pay the price required to increase the profits from livestock is shown by the progress which has been made during 18 years of fighting the cattle tick. In 1906, when the campaign was opened to drive this pest out of the country, nearly 730,000 square miles in the South were quarantined. As a result of the work of Federal authorities in co-operation with the states and counties the infested area has been cut down by 69 per cent. In other words, this destructive insect, by means of dipping and by management methods which starved out the pests on pastures, has been eliminated from all but approximately 225,000 square miles, a

SHEEP PLUS A PERMANENT PASTURE PLACED THE LIVESTOCK ENTERPRISE OF THIS SOUTHERN FARMER ON A PROFITABLE BASIS

tremendous accomplishment when the nature of much of this country is taken into consideration. A country that can do this much to build up its livestock industry can probably go much further in improvement. But the hard end of the job is still to be done, for the most recalcitrant communities remain to be brought into line, not only for their own good but for the advantage of their neighbors, who will be in danger of reinfestation until all ticks have been starved or poisoned.

But the greatest opportunity the South has today lies in the better use of its timber resources. And this, be it known, is strictly an agricultural opportunity. Forestry is a part of agriculture. Growing trees is distinctly an agricultural operation, like raising corn or wheat. The period till maturity is longer, but from the standpoint of national welfare trees must be grown like any other crop. Originally practically all the South was forested, except the prairie areas of Alabama, Mississippi, Arkansas and those of central Texas and western Oklahoma. Up to the present parts of the South have lived very largely on their inherited forest wealth. Parts of the region have been

PASTURE IMPROVEMENT IS NEEDED IN THE SOUTH TO KEEP PACE WITH LIVESTOCK DEVELOPMENT
These Cows Are Enjoying a Pasture Being Built Up Along Improved Lines

more dependent on its timber, lumber and naval stores than on cotton and corn.

There are today 100,000,000 acres of cut-over and brush land in the South. Much of the remaining 80,000,000 acres of merchantable timber will be cut-over and brush land within a few decades. What is to be done with the idle resources in this vast acreage? This is more than double the present acreage of land in crops. It is not practical to bring this brush and cut-over land rapidly under cultivation for farm crops. It has been estimated that probably not one-third of this area of forest and cut-over land in the South will be needed for agricultural use in the next half century. The remaining two-thirds will be needed, and in a very pressing way, for growing timber and forest products in general. The best thing for many parts of the South today is to set about growing another crop of timber.

In the last 50 years the South has furnished 500,000,000,000 feet of lumber to the country's markets, or about one-third of all the lumber cut in the United States. Its pine forests still produce three-fourths of the world's supply of turpentine and rosin. But the industry cannot continue on this scale under present methods. The lumber cut declined from 20,000,000,000 feet in 1909 to 14,000,000,000 in 1922, and the output of turpentine fell from 29,000,000 to 22,400,000 gallons in the same period. Less than 500,000,000,000 feet of timber remains. Thirty-three million acres, an area larger than the state of Alabama, is denuded of timber and practically unutilized.

Effective utilization of this vast area, including both the land now idle and that yet to be cut over, is one of the most critical problems the South has to face. Two-thirds of the whole, and practically all of the denuded area, is pine land, very little of which is likely to be wanted for any other use within a long period. That this land will produce timber crops is certain. Southern forests, with their long-growing season and fairly abundant rainfall, can yield more timber in a given period than those of any other part of the country except portions of the Pacific Northwest and limited areas in the Northeast. It has been estimated, indeed, that the South could produce each year, on its present forest area, at least 25,000,000,000 board feet, instead of the 4,000,000,000 feet annually grown now.

Other factors than rapid growth are also particularly favorable to timber growing in this region. The long-leaf and slash pine forests are practically unique, in that they afford an opportunity for early supplementary income from naval stores while the main timber crop is growing. Over most of the region the surface favors easy logging and cheap transportation, and consequently gives a higher return to the timber grower. The geographical location, with comparatively nearby markets in the great timber-consuming regions of the Northeastern and Central states, and cheap water transportation to the West Indies, South America and Europe, insures Southern-grown timber a considerable margin of stumpage value above that grown in the more distant Pacific states.

What the South mainly needs is a broader diversification, not so much only of crops alone, but in the utilization of all the land. There are three main agricultural uses of land. It can be used for crops, for pasture and for forest. In crop production the South is fairly advanced. It is backward in the use of its pasture and forest possibilities. A beginning has been made toward the better utilization of the pasture resources, but the application of forestry methods to the timber lands of the South has scarcely begun. As the South has the largest area of lands suitable for forests in the United States, its cut-over land utilization problem is not only a regional but also a national problem. There is no branch of agriculture in which far-sighted enterprise promises larger rewards.

Diversification Usurps King Cotton's Place in Dixie

By Dr. Andrew M. Soule, President Georgia State College of Agriculture, Athens, Ga.

The South is no longer that section from which we obtain only our supplies of raw cotton. On the contrary, it is a richly diversified agricultural area in which as great a variety of crops and as abundant an animal life has been developed, and is as satisfactorily sustained as in any territory of similar extent upon the face of the globe. Celebrated in song and story for the cultivation of cotton during the ante-bellum period of its history and hence for the predominating influence it has exercised upon the textile industries of the world, it has quite naturally and very properly come to be regarded as the principal world center in which cotton is raised on a great commercial scale.

Andrew M. Soule

Under these conditions it is not surprising to find that the thousands of visitors who annually flock southward to enjoy its balmy winter climate, high altitudes, benign, health-giving springs and resorts, glorious pine forests and its beautiful and varied flora are amazed when they cross the Potomac to travel many miles without finding any evidences of the cultivation of cotton. They can hardly believe that they are traveling through a country interspersed with hill and dale, picturesque landscapes, level bottoms, verdant pastures and abundant waterways; a section, in fact, quite similar to their own in so far as its topographical features are concerned. Hence, their preconceived ideas are soon forced to give way to a realization of the fact that the South is, after all, a country of widely diversified production and varied agricultural interests, and not merely "the land of cotton."

To begin with, the South literally embraces a series of comprehensive and coextensive agricultural empires. Practically one-third of the total land area of the United States, or approximately a million square miles, lie within its borders. It contains one-third of the population of the continental area of our whole country. In 1923 the crops and livestock marketed from its fertile fields were worth $6,127,400,000. The value of the 10,081,000 bales of cotton harvested sold for $1,563,347,000; including the seed, for $1,750,000,000. Of course, this is a large sum of money, and when the ever-widening influence of the cotton plant upon the destiny of men and nations is taken into consideration, it is not surprising to find that people in general have erroneously concluded that cotton and not much else of great economic or commercial importance is grown in Dixie. A mere glance at the figures quoted demonstrates that less than one-third, in reality 31 per cent, of the crop values of the South are represented by cotton.

The census of 1920 showed that there are 3,459,528 farms in the South. The operators living thereon controlled 604,857,600 acres, of which 181,259,539 would be classed as improved, 108,297,138 as woodland and 94,395,325 as unimproved. Much of the land in question is admirably adapted for the cultivation of grasses and other grazing and forage crops, thereby insuring the continued rapid and substantial growth of a livestock industry adequate to supply not only local needs, but also making a large contribution of food supplies to other sections of the country whenever conditions warrant the same.

Owners controlled nearly one-half of the land in farms, while tenants operated but 116,030,898 acres. The value of all farm property was $21,685,380,495. Conditions in the South, in so far as agricultural wealth, landownership, and operation are concerned, compare very favorably with other sections of the United States. With so great an area of land set aside for woodland purposes, it is self-evident that if the measure of attention and consideration is given to forestry which now seems assured, an abundance of the raw material vital to the proper support and expansion of the woodworking industries of this section of the country can be relied upon for an indefinite period of time. It also means that lumber out of which to build homes and for other fundamental purposes can be secured and utilized more cheaply than in any other part of the country. In this connection it is proper to state that many of the finest varieties of trees suited to the commercial needs of the nation find a natural habitat in the South, while the climatic conditions are so favorable and the rainfall so abundant and uniformly distributed as to insure the renewal of denuded areas of land with timber suitable for the saw in a shorter period of time than in any other part of the United States.

An examination of the record indicates that the value of the livestock on Southern farms aggregates $2,627,888,964, or a third, in fact, of the total worth of all the animals in the United States. The number of meat animals on farms and ranches January 1, 1924, was 47,771,000, and was made up of 22,051,000 head of cattle, 7,008,000 sheep and 18,912,000 swine. A very substantial growth in the dairy and swine industries has taken place in recent years, while beef cattle have held their own. A further material expansion of the dairy and swine industries is now in progress. An abundant supply of farm motive power is provided by 4,823,000 head of horses and 4,336,000 mules. The remarkable progress made in the livestock industry in the past is not an ephemeral matter, but rapid and continued growth is certain in the future, due to the remarkably varied grain, coarse food and hay crops, which can be grown with such splendid success, and also on account of the relatively large area of cheap land available for grazing. Moreover, through scientific endeavor and Federal and state co-operation, the one great menace to the practice of livestock husbandry in the South has all but been banished from its borders. Reference is here made, of course, to the eradication of the cattle tick. This is an achievement of which every citizen of the South has a right to be proud. It is a fine illustration of the co-operative unanimity and progressive spirit by which the landowners of this section are actuated.

In 1923, 29 per cent of the nation's corn crop, or approximately 890,000,000 bushels, were harvested in Dixie Land. Even 17 per cent of the wheat, considered essentially a crop adapted to the Northwestern states, or 138,000,000 bushels, were grown south of the Ohio River. Likewise, 12 per cent of the oats, or 164,000,000 bushels,

were raised in the South. About 28,000,000 bushels, or 83 per cent, of the rice came from the same source. But repetition of figures of this kind grows irksome. So, the endeavor will be made to enumerate as briefly as possible some of the other important food crops, with regard to which Southern farmers make a notable contribution. Ninety-three per cent, or more than 90,000,000 bushels, of sweet potatoes; 1,264,852,000 pounds, or 85 per cent, of the tobacco supply; 636,000,000 pounds of peanuts, or virtually 100 per cent of this crop; 29,000,000 gallons of sorghum syrup, or 90 per cent of the available supply; 344,000,000 pounds of cane sugar, or 100 per cent of this fundamental food produced in the United States; 33,600,000 gallons of cane syrup, or 100 per cent of this desirable and wholesome nutrient; 10,000,000 bushels of cowpeas, or 94 per cent of the crop; 27,066 cars of watermelons, or 81 per cent of the commercial shipments; 17,000,000 bushels of pecans, or 98 per cent of the crop; 3,462,000 hampers of snap beans, or 69 per cent of the crop; 6,059,000 bushels of spinach, or 70 per cent of the crop; 3,205,000 hampers of cucumbers, or 76 per cent of the crop, and 7,713,000 bushels, or 45 per cent of the tomato crop were grown, harvested and forwarded into the channels of trade by Southern farmers in 1923.

What a remarkable service to the commercial transportation and industrial activities of the nation this represents! Who, in the light of these facts, can be so blinded and prejudiced as to think of the South in the future as merely a land in which cotton is grown? As a matter of fact, if the cultivation of this staple was forever rendered impracticable to the series of great Commonwealths which make up this part of the United States, it would be but a comparatively short time until our farmers could so direct their energies into other lines of production as to more than offset the loss accruing to them through the complete elimination of the cotton crop. Those who are in the "doubting Thomas" class have only to familiarize themselves with the figures quoted above to be convinced of the reasonableness of this statement.

There is another phase of agricultural development in the South the volumetric importance of which is not properly understood or appreciated; namely, the great quantities of fruit and truck which are sent to Northern markets each year. So great has this business become that it is difficult to visualize it in a graphic way. It is doubtful if the residents of the populous North and West realize how much of the vitamine-providing fruit and vegetables so essential to their health and happiness come from the sunny South. It is amazing, and the word is used advisedly, to find that approximately 500,000 cars of fruit and truck go North each year by fast freight and express. Presumably, the resident population of this section consumes as much more. The rapid growth and the great economic importance of this phase of our agricultural enterprises are well illustrated by the fact that the cotton crop, great as it undoubtedly is, does not require more than half as much railroad equipment for its adequate handling. These facts and figures may help to convey to the average layman's mind a better understanding and appreciation, therefore, of the size and vigor of these

1—Young Romaine. 2—Young Lettuce in Field Equipped With Overhead Irrigation. 3—Beans and Cucumbers. 4—Brussels Sprouts and Irish Potatoes. 5—Butter Beans

At Top—Grapes in North Carolina. A Mississippi Field of Irish Potatoes in February. Bottom—Cabbage Field Near Columbia, S. C.

industries, which, in all truth and candor, may still be regarded as in their infancy in so far as the potential producing power of Southern soils is concerned.

The statement which follows is based upon carload shipments for 1923 as recorded and distributed through the agency of the Bureau of Agricultural Economics of the United States Department of Agriculture. The data presented show the quantity and variety of the fruit and truck crops originating in each of the Southern states concerned. The total contribution from the South to the perishable food supply of the nation as a whole is thus succinctly set forth. It is easy to see that, in spite of the remarkable growth which has already taken place, there is still ample room for rapid expansion and material development along many other specialized lines as well as those included in this report.

The fruits handled consisted of seven distinct types of perishables as follows: Apples, cantaloupes, grapefruit, oranges, peaches, strawberries and watermelons. The shipments from the sixteen states reached the great total of 124,438 solid cars. The carload shipments of fruit of this character from the United States as a whole totaled 332,252. Thus, the South supplied more than one-third of the perishable fruits consumed by the nation.

The record shows that 23,322 carloads of apples, or approximately one-fifth of the national supply; 18,535 carloads of grapefruit, or practically all of this fruit; 26,567 carloads of oranges, or more than one-third of this fruit; 11,010 carloads of peaches, or about one-third of this fruit; 14,799 carloads of strawberries, or almost three-fourths of this fruit; and 27,066 carloads of watermelons, or nine-elevenths of the entire crop, originated in the South. In addition, the South shipped out 113 cars of grapes and 378 cars of pears. What a gratifying contribution to the essential food needs of the nation this represents! And should it not fully convince the most skeptical that the South is now far from being an all-cotton country? It is easy to understand that but for the substantial contribution which the South is making to our perishable-fruit supply the tables of rich and poor alike

CARLOAD SHIPMENTS OF FRUIT FROM SOUTHERN STATES, 1923

States	Apples	Cantaloupes	Grapefruit	Oranges	Peaches	Strawberries	Watermelons	Total
Alabama	4	.....	.....	580	1	693	1,256	2,534
Arkansas	2,361	340	.....	....	759	1,342	193	4,995
Florida	.....	36	18,476	25,976	1	1,035	4,317	49,841
Georgia	179	222	.....	.....	8,701	27	7,553	16,682
Kentucky	36	.....	.....	.....	1	824	.....	861
Louisiana	.....	1	.....	.....	.....	1,678	41	1,720
Maryland	1,882	1,271	.....	.....	785	1,916	580	6,434
Mississippi	.....	.....	.....	11	.....	141	77	229
Missouri	3,593	11	.....	.....	2	872	1,808	6,286
North Carolina	181	619	.....	.....	251	1,667	1,532	4,250
Oklahoma	14	1	.....	.....	89	3	64	171
South Carolina	.....	70	.....	.....	16	60	4,011	4,157
Tennessee	26	173	.....	.....	53	3,289	.....	3,541
Texas	20	389	59	.....	102	59	5,416	6,045
Virginia	8,746	3	.....	.....	72	1,193	169	10,183
West Virginia	6,280	3	.....	.....	177	.....	49	6,509
Total South	23,322	3,139	18,535	26,567	11,010	14,799	27,066	124,438
United States	127,505	25,839	19,150	74,948	33,630	17,775	33,405	332,252

PEACH ORCHARD AND PACKING SHED NEAR FORT VALLEY, GA.—THE SOUTH PRODUCES ONE-THIRD OF COUNTRY'S PEACHES

AN IRISH POTATO FIELD AT MEGGETTS, S. C.—THE SOUTH

in many of our Northern homes would be devoid of the varied and luscious fruit with which they are now so abundantly supplied. This would constitute a national misfortune of no mean proportions, for medical authorities now regard the liberal use of raw fruits as fundamental to the maintenance of a good state of health and physical prowess on the part of all classes of our citizens.

Of course, the cultivation of fruit is emphasized more in some states than in others. Those who are interested in making investments in the South will no doubt find the facts as summarized of a most instructive and revealing nature. Florida naturally shipped the largest quantity of fruit, or a total of 49,841 carloads, consisting mainly of grapefruit, oranges, strawberries and watermelons. This state literally provides the grapefruit supply of the nation. Georgia contributed 16,682 carloads of fruit to the total and was the second largest shipper of perishables. She marketed 8701 carloads of peaches and 7553 carloads of watermelons. During 1924 these figures are practically doubled, showing the astonishing growth which the peach and watermelon industries made during the year. This is but an evidence of the type and character of

TYPICAL CELERY HARVEST SCENE IN FLORIDA

PRODUCES ABOUT 65,000,000 BUSHELS OF IRISH POTATOES ANNUALLY

progress which is being made in the carlot shipments of perishable fruits from all of the states. Virginia shipped 8746 carloads of apples, West Virginia 6280 carloads and Missouri shipped 3593 carloads. Many people will no doubt be surprised to find that Virginia, by reason of her location, stands third in the list of the shippers of perishables with a contribution of 10,183 carloads of fruit. Tennessee shipped more strawberries than any other state, her total being 3289 cars.

When the land area, the climatic conditions, the favorable shipping facilities and the nearness to the great consuming markets of the country are taken into consideration, it is easy to see that a great expansion in the cultivation and forwarding of fruit from the South to less favored sections of the country is destined to take place. The opportunities for investments along any of the lines indicated cannot be surpassed, and he indeed would be a stupid individual who was not willing, in the light of the facts presented, to concede that the South as a contributor of this type of wholesome and desirable fruit to national needs is not yet well out of its swaddling clothes.

The carload shipment of truck aggregated 110,577 cars in 1923. The whole United States furnished 422,735 cars. The South, therefore, furnished one-fourth of the total supply. More than one-third of the cabbage handled on the carlot basis, or 14,462 cars, came from this section. Of the 29,493 carloads of lettuce shipped to consuming centers, we provided but 4599 cars. In this respect we are not doing our full duty, and it is certain that when once this fact is realized a material increase in the area devoted to the cultivation of this health-preserving vegetable will result. Of the 7682 carloads of spinach forwarded, the South contributed 7055 cars, so that we practically enjoy a monopoly in respect to this crop. Celery is supposed to be a cold-climate plant and to be grown to the greatest perfection in the rich muck, or semi-boggy, lands of cer-

THE COMMERCIAL ONION CROP OF THE SOUTH AVERAGES ABOUT 3,000,000 BUSHELS ANNUALLY

tain especially favored states bordering on the Great Lakes. Yet, of the 16,624 carloads handled in 1923, Florida shipped 6415, or 38 per cent. We are not emphasizing the cultivation of onions to a desirable degree, as we furnished about one-seventh of the gross supply in 1923, or 3712 carloads out of a total of 26,747 carloads handled. Texas grew the greater part of all the onions shipped North. There is a great opportunity for development along this line, for the very finest and choicest Bermuda onions may not only be grown in Texas but with

AN OVERHEAD IRRIGATED FIELD OF PEPPERS AT BARTOW, FLA.

equal success in other states lying along the Gulf Coast. In fact, the Bermuda onion is hardy at points much farther inland than was at first thought to be the case. In the shipment of early tomatoes the South has made a gratifying record, having furnished nearly two-thirds of the carload movement of this vegetable, or 14,633 cars out of a gross of 24,002 cars forwarded. The South also shipped two-thirds of the sweet potatoes, or 12,543 carloads out of the 18,793 cars handled. Special comment at this point relative to the sweet potato situation seems justified, because it is truly surprising to find that only so small a relative total of this important food crop was handled or consumed by our great and rapidly increasing urban population. The sweet potato is a thoroughly wholesome and delectable vegetable. It should find a more general and acceptable use in the homes of all our people. We need education along this line in order to increase the use of this viand to a desirable degree. We can but feel that those keen and aggressive individuals who have been instrumental in developing the South's trucking business to its present splendid proportions will be quick to see the opportunities herein offered and utilize them to the best advantage.

It has been contended by many that on account of climatic conditions the South is not capable of growing Irish potatoes of superior quality in great abundance. This is an erroneous conclusion, as our contribution of 36,882 cars to a gross movement of 238,983 cars for the whole country clearly demonstrates. At the same time, we are providing less than one-seventh of the carlot movement of Irish potatoes. This is another field in which development can be materially increased by those who give the

CARLOAD SHIPMENTS OF TRUCK FROM SOUTHERN STATES, 1923

States	Cabbage	Lettuce	Spinach	Celery	Onions	Tomatoes	Sweet Potatoes	Irish Potatoes	Mixed Vegetables	Total
Alabama	1,561	....	....	....	....	....	406	1,388	126	3,481
Arkansas	13	....	2	....	12	9	244	232	13	525
Florida	1,216	3,115	....	6,409	6	9,967	59	3,495	2,237	26,504
Georgia	93	5	....	6	....	18	791	372	11	1,296
Kentucky	85	....	....	....	261	122	68	1,261	147	1,944
Louisiana	449	3	2	....	81	4	758	833	2,324	4,454
Maryland	220	1	799	....	1	272	1,587	2,805	196	5,881
Mississippi	1,134	....	....	....	....	2,144	102	89	1,633	5,102
Missouri	23	....	45	.. .	40	12	9	872	7	1,008
North Carolina	358	718	23	....	....	....	654	3,467	740	5,960
Oklahoma	7	....	....	....	....	10	103	1,033	6	1,159
South Carolina	4,313	577	424	....	12	429	236	4,209	770	10,970
Tennessee	269	....	1	....	....	502	1,456	96	6	2,330
Texas	1,363	102	2,368	....	3,025	1,085	632	800	1,497	10,872
Virginia	3,333	78	3,391	....	274	47	5,435	15,842	547	28,947
West Virginia	25	....	....	....	....	12	3	88	16	144
Total South	14,462	4,599	7,055	6,415	3,712	14,633	12,543	36,882	10,276	110,577
United States	36,395	29,493	7,682	16,624	26,747	24,002	18,793	238,983	24,016	422,735

proper study, attention and consideration to its cultivation and shipment. The South enjoys the advantage of being able to grow Irish potatoes as a late winter or early spring crop, and to furnish them to Northern markets when they are practically bare of a desirable quality of a vegetable used in the average home in that part of the United States from two to three times daily.

Of mixed vegetables we furnished 10,276 cars, or two-fifths of the 24,016 cars forwarded to urban communities by rail and water transportation. More carloads of truck, 28,947 cars, originated in Virginia than in any other Southern state. This, no doubt, will be a surprise to many persons. Virginia, however, is a large grower not only of cabbage and spinach, but of sweet and Irish potatoes as well. Two of her counties on the Eastern Shore are justly celebrated above any other section of the country for the growth of Irish and sweet potatoes. The wealth accumulated in that small area speaks volumes for the possibilities of the trucking business. The success attending the efforts of the farmers living in the two counties mentioned in the cultivation, distribution and profitable marketing of this crop well demonstrates the fine co-operative spirit which has been engendered. If such an extensive movement can be made from so small an area as this, then other communities that enjoy the best natural facilities for the cultivation of truck crops, but are now failing to grow them, can do likewise if they but follow with success and discrimination the pathway blazed out by these Virginia pioneers.

In passing, it is important to remember that co-operative marketing is one of the agencies which the farmers of the South must employ with the greatest degree of skill and intelligence. They must follow this procedure in order to insure their receiving an adequate reward upon the effort they are expending in producing not only fruit, truck and cotton, but other foodstuffs and raw materials essential to the life activities of the nation and many other countries of the world as well.

Florida stands second in the matter of carlot shipments of truck crops, with a gross of 26,504 cars. As yet she is the only Southern state growing celery on a commercial basis. Her contribution of tomatoes was also large, aggregating 9967 cars. She stands next to Louisiana in the movement of carloads of mixed vegetables, though she falls below South Carolina and North Carolina in the matter of carlot shipments of Irish potatoes. South Carolina is emphasizing truck farming, as is evidenced by her shipment of 10,970 cars of mixed vegetables. She also marketed more cabbage than any other Southern state, and stands second in the movement of Irish potatoes as well. Texas ranks first in the matter of onion cultivation and second as a shipper of spinach, with 2368 cars to her credit.

A summation of the record reveals that 754,987 cars of fruit and truck were moved by the railroads of the country in 1923. Of this number the South furnished 235,015 cars, or somewhat less than one-third of the total movement. Surely this is a fine showing for an "all-cotton" section to make. But this still leaves the record incomplete, because evidently as much of the various fruits and vegetables mentioned above are handled by express as on the carlot basis. This statement is based upon the fact that in one small Georgia city the express office handled 25,000 crates of peaches during a single month. This was equivalent to the forwarding of between fifty and sixty carloads of fruit. Apparently there is no very satisfactory way of obtaining an accurate statement of express shipments. This is a fact greatly to be deplored, because if a reliable report of shipments of this nature could be obtained, it would fully justify the suggestion that the South is forwarding in the neighborhood of 500,000 cars of fruit and truck to Northern consuming centers each

TYPICAL VEGETABLE SHIPPING SCENE IN TRUCKING CENTERS OF THE SOUTH

Peanuts, One of the South's Money Crops

year, of which about 50 per cent goes by the express route. Take, for instance, asparagus, which is now being grown in some sections of Georgia on a rather extensive scale. Every bit of it is forwarded by express. The gross of these shipments would fill quite a number of cars. Dewberries also go forward by express, and many other small fruits and perishable vegetables that are cultivated in a more or less sporadic way but not on a basis which makes it possible to secure very accurate statistics relative thereto. If pecans are to be rated as a pomological crop, they should be included in the foregoing statement, from which they have been omitted. It is, of course, known that a considerable percentage of this crop is forwarded by express, though the movement on the carlot basis is now becoming more and more extensive, particularly from Georgia, in which state the cultivation of high-class, budded varieties chiefly centers at this time.

The food value of our cottonseed and peanuts, produced exclusively on a commercial basis at least in the South, is of national importance. The oil obtained from both of these crops is of the choicest quality. In fact, when it is properly refined, experts are unable to tell it from high-grade olive oil. More than three and three-quarter million tons of cottonseed are crushed annually. The by-products obtained aggregate an average of 1,000,000,000 pounds of crude oil, approximately 1,500,000 tons of cake and meal and 950,000 tons of hulls. No section of the country is provided with so wholesome and desirable a foodstuff for animals as cottonseed cake and meal constitute, and but for the fact that we offer to the trade such enormous quantities of crude oil, the wholesome, health-giving, appetizing salad, which has now become one

An Alabama Pecan Grove

of our most prized and esteemed national dishes, would have to be eliminated and the whole culinary procedure of our housewives of necessity reorganized. The impor-

1—Grading Sweet Potatoes in South Carolina. 2—Sample of Florida Cabbage. 3—Seed Corn, Hartsville, S. C. 4—Concord Grapes in the South

A MILE OF PEARS AT MARSHALLVILLE, GA.

tance of the peanut crop may be better evaluated when it is remembered that it now occupies 950,000 acres of land, with a production of 636,000,000 pounds. It is from the South that the peanut vendor of the street corner obtains his supply for parching. Peanuts, when crushed, yield a meal of very superior quality for feeding to livestock. They also furnish the raw material upon which our salted-peanut and peanut-butter industries are predicated. A ton of peanuts will yield eighty gallons of the very choicest oil. The peanut, therefore, already exercises a great influence upon our economic life and bears a distinctive relationship to the wise and proper nutrition of the American people. In addition, it furnishes a by-product essential to the proper growth, support and finishing-off of an ever-increasing number of meat animals on our farms. Thus, while the South has already made remarkable progress towards the establishment of a well-diversified agricultural practice, it is easy to see the very material expansion which may be anticipated along all lines when our as yet comparatively unutilized resources of concentrated foodstuffs are used for the enlargement of our livestock industries to that degree which it is easily possible for us to attain.

The substantial and uniform increase in the number of animals kept on our farms shows that the importance attaching to a fundamental program of livestock develop-

SEVEN-YEAR-OLD SATSUMA ORANGE TREE NEAR MOBILE, ALA.

GROWING ASPARAGUS IN GEORGIA

ment is being more generally appreciated from year to year. Through the scientific use of cottonseed meal, peanut meal, velvet bean meal, soy bean meal and cowpeas we can greatly increase our holdings of livestock and very soon become an exporting center of meat supplies to other sections. Our accomplishments in this direction are already quite noteworthy, as evidenced by the fact that there are at the present time 236 meat-slaughtering and meat-packing establishments operating in the Southern states, with a capitalization of $155,145,000 and doing a business of more than a half billion dollars annually.

Any comprehensive consideration of the South's relation to diversification must include and give proper recognition to the cultivation of tobacco, since we raise and forward to market nearly all of the choicest grades manufactured in the United States. Of the 1,820,000 acres devoted to this crop in 1923, 1,621,000 acres were located in the Southern states. Of the 1,474,786,000 pounds of cured tobacco harvested that year, 1,264,852,000 pounds came out of Southern fields. The total value of the crop harvested in the United States in 1923 was $298,936,000, of which Southern farmers received $244,434,000, or nearly five-sixths of the gross amount received.

The place which diversification occupies in the estimation of the Southern farmer is well exemplified by reference to the relative size of the land areas devoted to various farm crops. The most reliable figures available indicate that 130,250,000 acres of land were cultivated in the Southern states in 1923. This constitutes 25 per cent of the total crop area of the United States. Less than one-third of this area, or approximately 35,000,000 acres, were planted to cotton, leaving a balance of 95,250,000 acres devoted to the cultivation of grain —corn, wheat, oats—and the highly specialized truck, fruit and field crops, of which mention has already been made. There are some who may conclude that the area now planted to cotton has been limited by the ravages which the boll weevil has wrought, and that there will be an ever-increasing decline in the output of our cotton crop. Those who have reached such a conclusion as this are entirely mistaken. Through the skillful and intelligent use of calcium arsenate and a good, working knowledge of the life history of the boll weevil, it is now possible to combat his ravages to a degree which will enable the Southern farmer to continue to grow almost any amount of cotton, for which the world will pay him a living wage. The era of cheap cotton has passed, however, and the Southern farmer does not propose any longer to act the part of a slave to society, which he has done for the last century. He has now found that he can diversify his output and, by living at home and offering the surplus food crops he raises to other sections of the country, thrive and succeed even though the acreage formerly assigned to cotton be quite decidedly reduced. All the strivings to discover other parts of the world in which cotton can be cultivated as cheaply, as favorably and as successfully as in the South have as yet met with disappointment. Of course, there will be a considerable expansion of the cotton area abroad, but not of sufficient magnitude to seriously endanger the commanding position

Three-Year-Old Fig Orchard in Texas

FORTY ACRES OF PINEAPPLES IN LAKE WORTH, FLA., DRAINAGE DISTRICT

which the South still occupies as the main producer of raw cotton. It is clear to every thinking man, however, that the time has arrived when consumers of every class and description must pay more for raw cotton if we expect to continue to revel in its use as clothing to the degree and extent which has pertained in the past. The systematic effort which has been made from time to time to depress the price and rob the landowner of a just and fair reward for his labor constitutes a greater menace to the cotton industries of the world than all the destruction to the crop ever wrought by the boll weevil. There is no disposition on the part of the Southern farmer to so limit the cotton supply as to starve the users of the raw staple into paying an exorbitant price. Nevertheless, the "Shoe is now on the other foot," as the figures quoted in this article clearly indicate.

What of the South's future? It seems unnecessary to propound this question in view of the truly significant progress and expansion which has occurred during the last quarter of a century. Our program of crop diversification will continue to enlarge on account of the rapid developments being made along industrial lines and in response to the economic pressure which a rapidly increasing population superimposes upon our activities. It can be said of the people of the South, with a due measure of propriety, that they are "on their way and rejoicing" in the inherent strength and vigor of their own as yet comparatively undeveloped and undercapitalized resources. In a Buyers' Guide, which rests on my table, Georgia is credited with making a 46 per cent increase this year in her crop values, Mississippi with 37 per cent, Arkansas with 31 per cent, Oklahoma with 29 per cent; and so the story goes. Compare this with the record of other sections and be convinced that the claims set forth are modest and well within the facts in the case.

Only a small part of the natural resources of the South has been developed to any considerable degree as yet. We can treble and quadruple our output along any line that may be essential or fundamental. We have thousands of acres of unoccupied land ready to welcome capable and experienced husbandmen. There is a lower death rate in the South than in any other part of the United States. The altitudes and climatic conditions prevailing therein are favorable to the establishment and maintenance of the higher type of the white man's civilization. The after-the-war readjustment of our economic and social conditions as they pertain to farm practices has already taken place. We have found out how to control the boll weevil menace to a considerable degree. Nation-wide industries of the first magnitude are relocating and moving as rapidly as possible into the South because the homogeneous population found therein affords them an opportunity for securing a dependable class of Anglo-Saxon labor not obtainable elsewhere. A truly remarkable growth and expansion have taken place along educational lines, as the expenditure of more than $315,915,000 a year upon our common schools amply demonstrates. Institutions of higher learning are being liberally endowed and generously supported by both private and state agencies. A fine system of modern high schools has been built in which vocational education in particular is being emphasized and stressed to a highly commendable degree. The tax laws of a majority of the states have been modified and so readjusted as to offer excellent opportunities for substantial, safe and permanent investments along many lines. We have still the largest areas of available standing timber to be found in any part of the United States. No section will reward the landowner more quickly or more generously. A well thought-out and properly standardized program of highway construction is well under way.

Those who read this résumé may be disposed to charge me with an ardor that is not fully justified by all the facts in the case. Only those will fall into this error who are not familiar with the existing conditions or who have read jaundiced magazine articles or biased books, or perhaps obtained their knowledge of the South from the car window. Mark well the fact that in the olden days the movement was Westward, but the new generation of young Americans are unquestionably to find their privilege, opportunity and reward in the South.

A POLK COUNTY, FLA., WATERMELON FIELD

Dairying as a Factor in the South's Development

Betterment of Farm Conditions Seen as South Bids with Great Agricultural States of North for Dairy Prosperity.

By Craddock Goins, Milwaukee, Wis.

The milk cow, which has laid the trails of dairy prosperity in many lands, has been moving southward at a rapid rate in the last few years. Two hundred million dollars involved in dairy production in the Southern states in the last twelve months reflect the important part dairying is performing in the South's development. It is in the last ten years that dairying has become a strong commercial factor in the South. Its greatest development has been in the last three or four years, when the Southeastern states have gone into the matter with an enthusiasm promising great agricultural and industrial achievements for the Southern states east of the Mississippi, now recognized in great dairying centers of the country as a potential dairying empire of the greatest importance.

Craddock Goins

The South's dairying triumphs have a significance more far-reaching than in the fact that something like 350 creameries, 1500 ice-cream factories and hundreds of city milk plants and cheese factories have been established and on the whole are increasing production every year. The most important feature of dairying development is the fact that it is opening up a new wealth with which farmers can build up their land, improve their homes, educate their children for important citizenship duties and have more money with which to trade with their local merchants.

The dairy industry's national importance is indicated by figures showing that America's 1923 dairy production, with a farm value of $2,565,877,000, was more than one billion dollars greater than the 1923 cotton crop, excluding seed, of which more than half the world's supply is grown on Southern farms. It must also be remembered that there was a relatively good crop of cotton, with good prices, last year. In fact, the combined value of the 1923 cotton, wheat and potato crops of the United States only little more than equals the 1923 dairy output.

The value of dairy cows in the country on January 1, 1924, was $1,287,044,000. Other cattle in the country were valued at $1,052,599,000. Swine were valued at $638,793,000 and sheep at $302,092,000.

One-fifth of the annual family budget goes for dairy products, approximately $5,000,000,000 being spent for dairy products last year. There are now 24,675,000 dairy cows in the country. Of this number New England this year has 1,082,000, a decrease of 0.2 per cent from January 1, 1923. The Middle Atlantic states have 3,087,000, an increase of 1.5 per cent; the South Atlantic states 1,855,000, an increase of 0.2 per cent; the East North Central states 6,210,000, an increase of 1.3 per cent; the West North Central states 5,971,000, an increase of 2.6 per cent; the South Central 4,395,000, a decrease of 0.8 per cent; the Rocky Mountain states 884,000, an increase of 5.5 per cent, and the Pacific states 1,191,000, an increase of 3.7.

The Department of Agriculture's method of grouping makes the South Central states show a decrease, for in this group it includes Southwestern states that are falling behind.

The South is increasing its supply of purebred dairy cattle. Statistics on the percentage of purebred dairy cattle in 1920 give a comparison with other states and show the need of purebred cows in the South. But there is no doubt that Alabama has advanced considerably above its 0.8 per cent of purebred cows in 1920, as also Arkansas above its 0.9 per cent of purebred animals in 1920, Georgia with 1.3 per cent, Florida with 2.4 per cent, Kentucky 1.3 per cent, Louisiana 1.1 per cent, Mississippi 1.6 per cent, North Carolina 1.7 per cent, Oklahoma 1.2 per cent, South Carolina 1.7 per cent, Tennessee 1.7 per cent and Texas 1.6 per cent.

The men who had grave misgivings as to the future of Southern commercial dairying when experiments in this direction began ten years ago have received their answer in statistics showing that creamery butter production increased approximately 35,000,000 pounds over 1922, having reached an output of 117,384,000 pounds last year. Ice-cream production last year had increased from approximately 13,000,000 gallons to 18,070,000 gallons in the states of Virginia, the Carolinas, Tennessee, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Kentucky, Oklahoma and Texas. In addition, the manufacture of cheese, an infant industry, placed a couple of million pounds' output into the statistics columns, coining several hundred thousand dollars for farmers of the mountainous counties formerly impoverished by limited crop production.

Creamery Butter Manufactured in the South, 1920-1923

	1920 Pounds	1923 Pounds
Alabama	398,000	831,000
Arkansas	345,000	996,000
Florida	.....	99,000
Georgia	.....	1,868,000
Kentucky	7,875,000	12,244,000
Louisiana	55,000	185,000
Maryland	440,000	382,000
Mississippi	2,626,000	5,715,000
Missouri	35,228,000	51,818,000
North Carolina	832,000	1,718,000
Oklahoma	9,596,000	14,065,000
South Carolina	16,000	537,000
Tennessee	5,903,000	11,463,000
Texas	9,125,000	10,956,000
Virginia	2,210,000	4,231,000
West Virginia	867,000	276,000
Total	75,516,000	117,384,000

Type of Co-operative Creamery in Western North Carolina—Manufactured 333,995 Pounds of Butter in 1923—Owned and Operated by Farmers

That "prosperity follows the dairy cow," as national dairy leaders have declared for the last half century, is being evidenced in counties throughout virtually all parts of the South. In speaking of what creameries have done for Dallas county, Alabama, which has the first creamery established in that state, W. M. Cannon of Selma says farmers of that county are receiving more than $350,000 a year in cream checks to augment revenue from other crops, with present lively activities in this direction indicating that the farmers of that county will receive more than a half million dollars from their cows next year.

Creamery and cheese factory development in the South means the keeping at home of something like $200,000,000 formerly spent in other sections for butter, cheese and condensed milk, for which the Southern states are more favored in producing than the states into which this dairy money has been poured in the past.

The dairy silo, an extremely recent development that has come about since dairying has assured business men and agricultural leaders of a permanent place in the South, is a new landmark of agricultural prosperity in the Southern states. It stands as a monument to a new order of agricultural wealth. The silo makes it possible for Southern farmers to produce milk and cream far more cheaply than dairy products can be produced anywhere else through growing their own feedstuff instead of buying it from distant states. The dairy dollar is wiping out poverty in the prairie farm sections and illiteracy in the mountain counties.

In the light of what has taken place in the farm transition in the South, A. L. Mordt, a native of Illinois, now engaged in the dairying development of Mississippi, recently declared to a group of dairy leaders in Wisconsin, that:

"The Southeast is the dairymen's paradise, the truck farmer's Mecca, and in the next 25 years it is sure to be the wealthiest and most active section of the country in all phases of development. It is to take its place as America's greatest agricultural and industrial center. It has the railroads, the markets and, with the aid of dairy-

HOLSTEIN CATTLE AT MILKING TIME ON A VIRGINIA DAIRY FARM
Types of Virginia Dairy Barns

ing and diversification, it is building, building, building. Wise men will watch the Southeast for investments.

"If the Southeast can produce butter ten cents a pound cheaper than Minnesota, it is in the Southeast that butter will be made."

The early days of dairying in the South caused many to speculate as to how this pursuit would fit in with cotton production. It has been proved in the last few years that cotton and dairy crops are two well-mated handmaids of profit. In Colquitt county, Georgia, where actual statistical comparisons have been made by this writer, it has been discovered that the money paid out for cotton produced in that county three years ago is less than that being paid out for dairy products at this time. These figures are supported by the editor of the Moultrie (Ga.) Observer, who declares that when farmers of his county

tion by the Northeast Mississippi Prairie Farmers' Co-operative Association demonstrated Mississippi's dairying advantages. The Mississippi delegates made a tour of Wisconsin dairying centers, spreading news of their potential dairy wealth among some of the most advanced farmers of this great agricultural state.

There were other dairy delegates from Tennessee, Virginia, Florida, Arkansas, Kentucky, Oklahoma, Texas and the Carolinas; and there was a splendid exhibit of dairying advantages in southern Maryland.

The most significant feature of the South's dairying advantages is the influx of good dairy cows. Early pioneers long ago pointed out that proper cows are essential to profitable dairying. The cow population of the South increased about 100,000 in 1923, and when it is reflected that the newcomers were, for the most part, the finest

JERSEY HERD ON $50 AN ACRE LAND IN CENTRAL SOUTH WHICH WILL GRAZE MORE CATTLE THAN $300 AN ACRE LAND ELSEWHERE

Inserts—Types of Some Guernsey Stock in Georgia

get into dairying in earnest "we shall have an income from dairy products greater than we have ever received from cotton, and dairying will be a sideline with us."

The South is going in for quality dairy production. Profiting from early mistakes in the middle West, the new dairying section is devoting itself to producing dairy products that will get premium prices.

At the National Dairy Exposition in Milwaukee in September the South opened the eyes of a number of Northern dairymen as to numerous advantages below the Ohio River for profitable dairying farming. The Georgia Association had a booth in which it demonstrated the great amount of feedstuff that economically can be produced in the South, showing samples of alfalfa which can be grown to six or seven cuttings in the South against three or four in Wisconsin; samples of pasturage that can be grown nine months in the South, and in some parts of that section nearly all the year around.

An exhibit car brought to the National Dairy Exposi-

kind of dairy cows, it can be understood that the South is fortifying itself for a mighty effort toward future development in this direction.

The farmer of a few years ago who raised only cotton and big debts is fast giving way before the diversified farmer producing cream, eggs, livestock, corn, alfalfa, vegetables, potatoes and many other kinds of crops. The creameries are the most important link in this farm scheme. They form a distributing center in marketing eggs for the best possible prices. Farmers supplying the creameries with cream are enabled to have their eggs gathered every time the creamery truck passes, twice a week or so, and by thus concentrating the eggs of a given community upon a common center these eggs reach a waiting market while they are fresh and command the highest prices.

Kentucky probably is the leading Southern state in dairying development. In 1923 that state had climbed from thirty-fourth to twentieth in rank among the cream-

ery-producing states of the country, producing 12,244,000 pounds of creamery butter in 1923, virtually double its production of 1914.

From 190,000 milk cows in 1910 the cow population has grown to 520,000. Jerseys, Holsteins and Guernseys predominate, in the order given. Eighty-one per cent of

Some of South's Registered Holstein Cattle

the farms of the state have dairy cows, a higher percentage than of any other type of animal, except poultry. The cows usually are in herds of from two to six heads. Appreciating that Kentucky is destined to be a great dairy state, large creameries of the North have established plants there, including Swift, Armour, the Blue Valley Creamery Company, the Beatrice Creamery Company, the Sugar Creek Creamery Company, etc. Ice-cream production increased 32.4 per cent in Kentucky last year, a greater percentage of increase than for any other state in the country, except a sister Southern state, South Carolina, which had an increase of 36 per cent in production of ice cream. Kentucky's ice-cream production in 1923 amounted to 1,103,000 gallons.

Tennessee climbed from fortieth place among the creamery states of the country in 1914 to twenty-second place in 1923, producing last year 11,463,000 pounds of creamery butter. In 1923 the state had 45 creameries, 129 ice-

Shipping Cheddar Cheese in Car Lots from Western North Carolina

cream plants and 10 cheese factories. Dairy Inspector David P. Adams says the 1923 production figure is not a true indication of dairying progress in his state, as a drouth developed at a most inopportune time for dairymen. Three-quarters of the state's butter output is produced in central Tennessee. At this time there are more than 2000 owners of registered Jersey cows in the state, 60 owners of registered Holsteins and ten owners of registered Guernseys.

Tennessee's gain in ice-cream production for 1923 over the previous year was 14 per cent, with an output last year of 1,370,000 gallons. While there is a considerable milk market in middle Tennessee, this section mostly is a creamery butter center. A large part of the cream shipped into the various centers is used in the manufacture of ice cream.

Twenty-seven Mississippi creameries last year produced 5,715,000 pounds of butter, against 207,000 pounds in 1914, thus climbing from thirty-seventh to twenty-seventh place. The output in 1922 was an increase of 35 per cent over 1921, and last year's output was an increase of 6 per cent over 1922. Commissioner P. P. Garner declares Mississippi dairymen every year are growing more of their own feedstuff, thus lessening production costs. There are twenty-five creameries in the state, so located that most every farmer can ship cream. Creamery butter was first made in that state in 1912, there being a production of 17,012 pounds the first year, 184,027 pounds the next, 325,851 pounds the following year and a material increase each succeeding year. The future looks exceedingly bright, both to Commissioner Garner and to Prof. J. S. Moore of the Mississippi Agricultural and Mechani-

Southern Farmers Find Milk-Fed Chickens Most Profitable

cal College, who have done splendid work in advancing the industry. In ten years dairying has become a profitable feature of activities on some 10,000 or more farms prior to 1921. When dairy extension work was begun by the Agricultural and Mechanical College there was no commercial dairying in the state, except for about $20,000 worth of milk shipped to New Orleans during the year. In 1922 creamery checks for Mississippi farmers amounted to $1,217,000, while $650,000 worth of milk was shipped to city markets. Kentucky was early in getting dairying started, because Kentucky had a good example set for its farmers by the farmers just across the Ohio River in Indiana, Illinois and Ohio. But Mississippi literally was driven to dairying by the boll weevil, which struck that state long before it reached Georgia, Tennessee and the Carolinas.

Georgia is the nation's wonder state in dairying devel-

A Florida World's Champion for Production in Dutch Belted Breed

opment. Great credit is given by State Dairy Inspector Henry F. Branham to Dr. B. W. Hunt for inculcating the dairying idea when the latter settled in Georgia in 1876, going from Pennsylvania. But there virtually was no creamery butter production in the state until 1920. Geor-

gia went into thirty-first place in rank among the butter-producing states in 1923, with an output of 1,894,000 pounds—truly an astonishing achievement with such a brief dairy history. The first cheese factory was built in Georgia in 1918. Creameries are progressing more rapidly in the southern part of the state, and the cheese factories are thriving more in the mountainous counties of the northern part of the state. There are 20 creameries, 12 cheese factories, 30 milk plants and about 10 certified-milk farms. Georgia imported 10,000 purebred or more or less highly graded dairy cows in 1923. The Ashburn Creamery in Turner county, where the "cow, hog and hen" program was inaugurated, has been the shining example for the farmers of the state. County agents are doing a splendid work. The railroads are co-operating. Georgia made 1,258,000 gallons of ice cream last year, a 10 per cent increase over 1922.

Georgia owes much to such sterling dairy boosters as Roland Turner, general agricultural agent of the Southern Railway; H. C. Bates, livestock agent of that system; F. H. Abbot, secretary of the Georgia Association; the late George Betts, founder of that organization; C. H. Bishop, president of the Georgia Creamerymen's Association, and to state college workers and county agents.

South Carolina is another state that had no ranking in creamery production until 1923, when it went into thirty-eighth place, with a production of 537,000 pounds of creamery butter. Prior to 1920 the outlook was not very encouraging to that state's dairying hopes. The first creamery was established by Clemson College in 1914. With the passing of many preliminary problems, an influx of good dairy cows has given a bright glow to the future. The dairy cow population shows an increase of 25 per cent in 1909, 21.4 per cent in 1919, 12.2 per cent in 1923 and ten per cent up to June, 1924, with many more fine, blooded animals on their way. There were 240,000 milk cows in South Carolina during the early part of 1924. The value of milk, cream and butterfat sold and of butter and cheese made was $7,995,753,000 in 1919, against only $2,800,000 in 1910. The 1924 valuation, no doubt, will be several million dollars greater. Through co-operative bull associations South Carolina has taken definite steps toward breeding up the quality of dairy cows in the state. In this respect the state has been a leader, in 1917 leading the whole United States with nine associations, the same in 1918, and eleven in 1919. Pennsylvania then pushed South Carolina into second place for the years 1920, 1921 and 1922. South Carolina now is in fourth place with sixteen associations using 44 Jerseys and 24 Guernsey bulls on approximately 2500 cows. Breeders are making creditable records. Nineteen breeders are testing with 124 cows, including 37 Holsteins, 63 Guernsey and 24 Jerseys. Sixteen certified Guernsey records for 1923 were above 500 pounds of butterfat. Twenty Holsteins went above 500 pounds of butterfat in 1923. There are sixteen creameries in operation. The state produced 559,000 gallons of ice cream last year.

Arkansas, not reported upon at all ten years ago, is given thirty-fourth place in creamery production for 1923, with an output of 996,000 pounds. There are 27 creameries, for the most part in the creamery section between Little Rock and Memphis, in the northern and northeastern parts of the state. The state has excellent railroad facilities for continued expansion. There was manufactured in Arkansas 703,000 gallons of ice cream last year.

HOLSTEIN DAIRY HERD ON PASTURE IN VIRGINIA

North Carolina rose from thirty-eighth place in 1914 to thirty-third in 1923 in creamery production, with 1,718,000 pounds of creamery butter last year, against 188,000 pounds in 1914. There are sixteen butter-making plants in the state. They are located so as to make available a cream market for virtually every section of the state. The majority of the creameries are located in the upper Piedmont belt.

The number of dairy cows, including heifers one year old and over, reported for January 1, 1920, was 354,557, as compared with 308,914 reported for April 15, 1910, an increase of 14.6 per cent. The farm value of dairy products in 1909 was $5,789,583, as compared with $14,912,137 for 1919, an increase of 157 per cent.

J. A. Arey, in charge of dairy extension work, points out the development of North Carolina's city milk-distributing plants as an index to the growth of dairying around the cities. All eleven of the present plants, with the exception of two, have been established in the past ten

years. Their combined output in 1919 was 2,000,000 gallons. In the state last year there was manufactured 1,075,000 gallons of ice cream, an increase of 11.1 per cent over the preceding year. This industry has had a phenomenal growth in the past ten years.

Virginia went into twenty-eighth place in creamery production last year, rising from thirty-second position, with a production of 4,231,000 pounds, an increase from 712,000 pounds in 1914. There are about 60 milk plants and creameries in the state, which went into dairying several years before most of the other Southern states. In 1908 Virginia produced 158,000 pounds of creamery butter, and in 1922 creameries of the state had an output of 3,306,420 pounds. In 1911 there were 22 creameries and milk plants, which produced 350,000 pounds of butter. In 1922 the state produced 128,491 pounds of cheese, and last year 257,000 pounds. Milk production has grown exceptionally fast in the last few years. Production in 1915 amounted to 5,159,970 gallons, and in 1922 it had increased to 19,530,729 gallons. The bluegrass area of the state cannot be surpassed for pasturage. The northern part of the state east of the Blue Ridge is producing great quantities of milk to supply the nation's capital. The state produces all crops necessary to feed dairy animals. The large dairy markets of the East are right at Virginia's door. The state produced 1,759,000 gallons of ice cream last year, an increase of 8.1 per cent.

Florida, not separately reported in 1914 dairy statistics, produced approximately 100,000 pounds of creamery butter last year, but the 1924 production is expected to be virtually double this figure. Leon county is the leading dairy county, with 3700 dairy cattle, including many fine registered herds of Jerseys, Ayrshires, Guernseys and Holsteins. The state produced 765,000 gallons of ice cream in 1923.

Texas stands twenty-third in creamery production with an output of 10,956,000 pounds in 1924, as compared with 7,247,000 pounds in 1914. Some creamerymen question the accuracy of these Government statistics, claiming that Texas' 1924 should be nearer 15,000,000 pounds than the figure with which it is credited. Texas is producing approximately 360,000,000 gallons of milk a year, or a million gallons a day. More than 90 per cent of the farmers have cows. There are 1,463,946 dairy cattle, which annually return $33,999,946 for dairy products. Texas ranks second to Ohio in the number of purebred Jerseys, with a total of 17,718. Texas breeders registered 4387 Jerseys during the fiscal year ending April 1, 1922. This is about equal to the number of Jerseys registered in Ohio, the leading Jersey state. Breeders have a good demand for surplus stock within Texas' own borders and look to New Mexico as an outlet in the near future. Despite its dairying advancement, the state annually imports approximately $20,000,000 worth of dairy products, which shows the remarkable room for expansion. The industry has steadily grown since the first creamery was established in 1905. The increase in production since that time amounts to 310 per cent. Texas produced 3,665,000 gallons of ice cream in 1923, an increase of 12.7 per cent over 1922.

Alabama is thirty-fifth in creamery production. Butter plants of that state last year made 831,000 pounds of butter, as compared with 11,000 pounds in 1914, when the state stood forty-second in rank. In 1911 there was

CRIMSON CLOVER AND PECAN ORCHARD

This Alabama Dairy Farmer Follows Crimson Clover with Irish Potatoes, Soy Beans, or Corn for Silage. Insert—Jerseys Grazing in Georgia

not a single creamery in the state. Thirty-five creameries have been established in recent years. The narrow strip extending through the southern central part of the state claims ten of these creameries, this remarkably favorable section producing 50 per cent or more dairy products than any other eleven counties in the state. This strip, called the "Black Belt," is one of the leading sections of the entire country in the production of "Grade A" milk. Quality milk has greatly stimulated consumption in recent years. The state produced approximately 1,000,000 pounds of ice cream last year.

Oklahoma, with a creamery production of 14,065,000 pounds, is eighteenth in rank. There are about 60 butter-making plants. Many of the state's ice-cream plants have made arrangements for combination plants to manufacture butter during part of the year. Prof. A. C. Baer of the Oklahoma Agricultural and Mechanical College believes the state's creamery production last year was probably five million pounds higher than the figure announced by the Department of Agriculture. The Oklahoma Agriculture and Mechanical College established the first creamery. A commercial creamery followed in 1901, and another in 1905. Six or seven new creameries entered in 1910. Many carloads of fairly good milk cows entered the state in the years 1907 to 1910. These cattle shipments have increased every year since. Centralizer creameries of Oklahoma, Kansas, Texas and Missouri are maintaining 1000 cream-buying stations in the state. Oklahoma creameries annually produce butter valued at $20,000,000. The 70 ice-cream manufactories of the state are working toward higher quality and more uniform standard every year. Oklahoma is the leading Southern and Southwest state in the manufacture of ice cream. It has ice-cream factories as modern and up to date as can be found in any part of the country. The state produced 1,672,000 gallons of ice cream in 1923, an increase of 5 per cent. A safe and adequate supply of milk is provided for the larger cities of the state. Dairying is making the farmers devote less acreage to cotton and wheat and more to alfalfa and other legumes; hay and row crops for silage are gaining in favor.

Louisiana produced 185,000 pounds of creamery butter in 1923, not being reported upon at all in 1914. The present year is expected to show considerable progress. Louisiana ice-cream manufacturers made 1,105,000 gallons of ice cream in 1923.

DAIRY SCENES IN OKLAHOMA

In every state covered in this résumé of the South's dairying development conditions are found to be ideal for the dairyman. Dairy leaders of the Southern states are exceedingly optimistic as to the future. Settlers from other states are delighted over their newly discovered dairying advantages. Nothing can be seen but continued growth for the Southern dairy industry, which is rapidly taking farmers of Dixie to that promised land of prosperity pointed out by Henry Grady when he declared that:

"When every farmer shall eat bread from his own fields and meat from his own pastures and disturbed by no creditor and enslaved by no debt; shall sit among his teeming gardens, and orchards, and vineyards, and dairies, and barnyards, pitching his crops to his own wisdom and

growing them in independence, making cotton his surplus crop, and selling it in his own time, and in his own chosen market, and not at a master's bidding—getting his pay in cash and not in a receipted mortgage that dis-

DAIRYING HAS COME INTO ITS OWN IN THE SOUTH
A Pair of South Carolina Show Animals of the Highest Type of Breeding

charges his debt but does not restore his freedom—then shall he be breaking the fullness of our day."

The new day is a day of diversification and dairy prosperity for the whole Southland.

South's Ice-Cream Development

Ice-cream production for the nation increased about 12 per cent during 1923 over the preceding year. The 1923 output is estimated at 294,000,000 gallons, an increase of approximately 30,000,000 gallons. Pennsylvania, with a 1923 production of 34,100,000 gallons, is the leading ice cream state.

It is one of the little inconsistencies of life that ice cream consumption per capita is less in the warm climate of the South, one of whose fair ladies introduced the product into this country and one of whose sons made the first ice-making machine, than in the cold Northern states.

The ice-cream industry is the leading branch of the dairy industry, being the first form of dairy manufacturing ever attempted in the South. The industry has shown a steady growth every year in the South, and today the ice cream served in Southern cities is on a par with the product in the average Northern city. Approximately $125,000,000 is invested in Southern ice-cream factories.

The Southern Association of Ice Cream Manufacturers has performed splendid work in the development of the South's ice-cream industry. Organized twelve years ago, the association has corrected many trade abuses, and this year is proceeding with an organized movement that promises to attract attention throughout the country. The association has taken steps to safeguard the ice cream produced within its membership, providing certain standards of quality necessary to membership. This quality standard will entitle a member to the right to display in all advertising the association's symbol of quality, which guarantees that the ice cream offered by that manufacturer is wholesome and pure.

There are approximately 1500 up-to-date ice-cream plants in the Southern states employing capital high in the millions. As competition grows in the Northern states, many manufacturers above the Ohio River are entering the Southern ice-cream industry.

A review of the South's dairying program brings to light this salient fact relating to future activities:

If the South, with a vast, ready-made dairy market right at its door, can produce butter better and more cheaply than can Minnesota, then it is in the South that butter is to be produced.

The same applies to Wisconsin's cheese supremacy. Just whether it applies to Pennsylvania's ice cream supremacy or New York's leadership in market milk remains to be seen. These two lines of dairy commerce thrive in the crowded industrial centers. So it is that the future of Southern dairy commerce is largely wrapped up in the future of Southern industry, and by the same token dairy farming development bears an important relationship to the South's general industrial future, representing as it does such an important force in building up general prosperity. To a large extent dairying has and will continue to contribute toward the very general industrial progress so important to dairying's security after it reaches its highest form of development.

Dairying, in league with the boll weevil, has taught a forceful lesson in the evils of one-crop farming. Dairying and its fair sister, diversification, are inseparable. They mean variety. That means farming on a cash basis.

Southern progress in dairying is the outstanding agricultural triumph of the last ten years. It is not to be wondered at that so many vigilant onlookers are convinced that the South with its newly diversified acres is destined to be America's own truck-farming paradise, and this, in the opinion of most observers, is not a matter of many years ahead.

Purebred Dairy Sires Are Taking Their Place at the Head of Southern Herds

Using the great dairy state of Wisconsin as a yardstick with which to measure the South's dairying advancement, we reach conclusions highly satisfying to those who are pleased to speak of the South as "the land of dairy destiny." Dairy marketing advantages in virtually all Southern states now are superior to marketing conditions facing Wisconsin today, after fifty years of dairying progress. It is particularly in production advantages that the South shows to greater advantage than any other dairying section of America, for the South can buy feed to keep cattle much more cheaply than can be done in the North and it has other conditions more favorable to high production.

The American South and Its Influence Upon Our Country's Future

By Courtenay De Kalb

The South, more than any other part of the United States, is a land of homes. Fifty years ago this honor would have been divided with the North. The fine home life of New England is now submerged in an alien horde seeking the promised sudden affluence that led them across the Atlantic. In the South the home remains a dominant institution. The Southern people are still reared under the inspiration of the sanctities of the home circle.

The last Census shows there are 51 persons in the group of states included in the classification of New England, Middle Atlantic and East North Central to every 7 persons in the South, and there is one home to every six people in those Northern states, while there is one home to every three and a half individuals in the South. The corresponding land areas are approximately as 4 to 9. Consequently there is no crowding in the South, either as to physical elbow-room or as to houseroom. On the other hand, there is crowding in the North, and there goes with it that kind of seething discontent that springs logically from alien thought engendered in too close and uncomfortable social and physical association.

The number of immigrants that have wandered into the South is so small as to be a trifling fraction of the total population. The *Blue Book of Southern Progress* shows only 8 per cent of foreign white stock in the South, as against 48.2 per cent for the rest of the country. The descendants of the original stock still hold the lands and homes in the South, but the Northern people, speaking broadly, have sold theirs to the alien. Which, then, by blood-determination, is the more certainly American?

When matters of this kind are under review the exception may not be adduced as evidence. The glory of the strong old Northern families, with their splendid traditions of patriotism and culture, has not become totally eclipsed, but is fast being obscured by the new voter who knows nothing of those ancient standards, who holds no reverence for Webster, or Emerson, or Professor James, or the galaxy of immortal singers whose voices rose sweetly above the granite hills and frosted meadows of New England. The old order passeth, and it remains to be seen whether the grandchildren of the Pilgrims will display strength sufficient to turn and swallow and digest this horde of aliens and remold them into semblance of anything like the old-fashioned Americans. The task is cyclopean; biologically it would seem to be hopeless, and the disparity of numbers is now so great that it would require nothing less than a miracle to effect it.

The South still is American. The blood of the old pioneers courses through the veins of its people. The American traditions still mean for the majority what they meant in the days of Jefferson, of Madison and Monroe. Here (note it well) an overwhelming *majority* of the people derive from colonial American stock and respond to American ideals. Not only statistics, but personal contact with the South rubs this fact into one. Perhaps there is less realization of this pregnant truth by the chance traveler who visits only the cities that are easily reached by trunk lines of railroad. Cities are essentially cosmopolitan; the disease of massive and overcostly "comforts," with million-dollar hotels and tip-extracting bell-boys, follows the lines of communication. For the glory and hope of America let it be said that this does not represent the true South. The true South is expressed by the kind of brain and soul that it breeds. It does not breed from alien minds nor from alien souls. It is not communistic, nor does it incline its ear to the wiles from Moscow. It is American, just as New England used to be, as New York and Pennsylvania, and New Jersey with her good red soil, used to be.

Take a branch railroad in Georgia or Alabama; go as far as it will carry you; then hire a buggy (there are still buggies in the South), or if need be rent an auto, and follow ways for roads yet to be built back to the valleys of some of those noble rivers, now almost deserted by steamboats, but which years ago floated rich cargoes to the sea. There you will find the time-swept mansions of ancient grandees. The later generations may not be rich in the goods of the earth today, but they are rich in the things of the spirit. Suddenly one finds himself in the midst of a people who have inherited nobility of soul; who think and reason as the old-time American was accustomed to do, holding to the ancient ideals of honor, of political integrity, of service for the commonweal, of religious devotion, of womanly sweetness and purity. I recall one incident that will be recognized by every Southerner as characteristic. It was in a tiny village 50 miles from the railroad, on the banks of a placid river where once, they say, the bottom lands produced three bales of cotton to the acre. An annual gathering of the people for many miles up and down the valley had assembled at a Baptist church. They were clad plainly but neatly. The edifice was crowded with men, women and children. A young lawyer held the rostrum as I entered, and was explaining certain characteristics of the Roman Empire in the days when the persecution of Christians was considered a duty of the State. The corruption of Rome was pictured with striking effect, and the dangers of imperialism were expounded, with Rome serving as the example of error. Did the audience yawn or go to sleep ? Not at all! As soon as the young orator ceased men sprang to their feet to continue the discussion. The question of association with European nations was argued with resurgence of the Jeffersonian doctrines of isolation. They did not believe in Europe and internationalism, but they believed in simon-pure Americanism. Presently the crowd filed out to tables under the trees to consume fried chicken and the accessory viands that ritualistically accompany it. Here the rural (I had almost said rustic) character of the people, which might have been subject to doubt from the argument in the church, stood revealed by nearer contact. Can anyone conceive such an assemblage of tillers of the soil today in most of New England or New Jersey? In the South it is typical; in the North it would be possible only in rare and select communities.

With so great a distinction between the present nature of the population North and South, it follows that the South possesses something that is needed by and for America. The old so-called "melting pot" has proved a delusion. The alien did not melt and diffuse into the good American stock and make more good Americans. Instead he proved an absorbent and adulterant. He has absorbed wealth; he has absorbed good houses; he has absorbed the outer garb of the better classes; he has

bought automobiles, and his children have gone joy-riding with the good Americans, and married them—and then the laws of heredity have produced offspring relentlessly in accord with the Mendelian principle. That means, not to re-expound what is available to whoever chooses to read, that the offspring, while not devoid of the blue strain, develop more of the yellow strain as succeeding generations come forward, because the yellow strain inheres in every product, and that recurring lower type runs as a persistent polluting stream that never becomes eradicated. The proletarian habit of mind, of response to the emotions of life, reappears and colors the mental acts and limits the mental attainment of every new generation, with no known end to the chain. The great problem of America arises from this diffusion of the alien blood and the alien chromosomes, steadily lowering the level of the whole. We are just at the beginning of the struggle to resist the influence of this infusion of the alien mentality which threatens American institutions. We talk about returning to the doctrines of the fathers of the republic and of saving the Constitution from the inroads of radicalism that have already debased political life in so many parts of the country. Meanwhile the descendants of the alien immigrant are growing as an expanding circle where a stone has been thrown into the pond, and the circle threatens presently to embrace the whole of the pond. The South is still free from that contaminating horde. Its hope of salvation is to keep free from it.

Whence cometh American redemption? Can it come from aliens of proletarian origin? Must it not come, rather, from descendants of the brave first American pioneers, with their lofty ideals of honest individualism and their devotion to Christian worship? Preservation of American principles of liberty and resistance to the conception of the rule of the hoi polloi by direct action, which is the antithesis of the principles laid down in the Constitution, depend upon keeping the South free from the proletarian blood and upon maintaining a self-conscious purpose of safeguarding the national ideals by building up Southern industries from within. This is not to turn cold upon capital from other parts of the country, but it is to keep Southern industries consciously and purposely so associated with Southern energy and co-operation as to ensure that it shall express the dignity of America untrammeled by the radical notions of the European proletariat. Only a few short decades ago Japan, having a national life that she deemed worthy of preservation, having national ideas of which she was jealous, having superior brain-power of which she was self-conscious, began to develop her resources, and persisted with such effect that today Japanese political influence and commercial rivalry constitute a force felt round the world. It was not foreign capital, but Japanese energy, faith, determination and Japanese brains that achieved this marvel. The South also has her intellectual vigor, as her attainments in every phase of life attest, and she has her ideals, which are the old American ideals that created the greatness of this free republic; and with faith, with conviction, with understanding that she is laboring not merely to make money but to perpetuate that kind of civilization which expresses the ambitions of Washington and Jefferson and the mighty intellectual giants that surrounded them, she can do for herself and for the United States what Japan did for herself. If not done by the South, it is not easy to see how it ever can be done. The alien has the North already in his grip. One has but to look at Massachusetts or Connecticut or New Jersey to see that it is neo-Americanism that is of vogue, in which resides no reverence for the Constitution of our fathers, no belief in the old commercial honor, no devotion to the doctrines of Christ, but instead a frank acceptance of paganism and a code of ethics that bears no impress of the Christian teachings. Let no one grow excited lest there seem to be failure to recognize the existence of noble spirits in those Northern states, but let him look about and ask himself: "Are we of the North, who hark back to the good old Americans, today in the majority, or are we in the minority?" The answer will accord with the facts of the average circumstances under which their public affairs year after year are administered for them by aliens and the sons of aliens.

The slogan of the Southerner, therefore, should continue to be: "Build from within!" Again, he should cherish the purpose to qualify in leadership. Leadership was a paramount factor in the nature of the first pioneers of America. They were leaders in spirit and they led in fact. They subdued a wilderness; they created industry, such as fitted the simple needs of a pioneer community. No one resents the initiative of a competent leader, and through the spirit of faith and confidence in a great purpose the South can continue to produce those strong individualists who lead to success and whom it is an inspiration to follow.

That is what the South long has been doing. Stripped to the raw by the Civil War, without credit beyond its borders, feared by those outside, who would less readily invest their capital below Mason and Dixon's line fifty years ago than men of our day will venture into uncertain Mexico, with only one great staple that the world insisted on having, the Southern people have built up their country so that no one longer thinks of the South as a "section" of the United States. It is a homogeneous part of the body politic. By building from within, the South has increased its total bank deposits from $190,564,000 in 1880 to $6,515,000,000 in 1923. She has half the cotton factories in the United States and she produces one-third of the manufactured cotton. She has made another Pittsburgh of Birmingham, and the leaders in her industries have been essentially men of Southern birth and early training. The South has received assistance through the association of Northern capital, but the tremendous economic redemption of the South has been due to the brains and energy of her own sons. She has established the precedent of leadership in the unfolding of her resources, and her reputation for conservative, capable management has induced faith in the desirability of joining in Southern enterprises. It is doubtful, however, whether there has been much self-consciousness of this power among those who have been active in creating the so-called New South. They have seen the opportunities and proceeded to develop them. It is important that henceforward there should be self-conscious purpose in doing such things with a view to conserving the Republic from the dangers that threaten through the rapidly accelerating infection of radicalism that is spreading throughout the nation.

With the South steadfastly American, it will be difficult to alter the forms of government under which, through the test of decades, our liberties have been assured. The tendency to divert our type of government into one in which the passionate sanction of the fickle populace shall determine legislation and administrative affairs that only careful deliberation by superior representative citizens should direct in the interest of the state can be withstood only by a body of men imbued with the spirit of our early Americanism. Only this can thwart the program of the neo-Americans, infected with radical teachings, which includes the prostitution of the judiciary to the whim of the irresponsible multitude.

It must be said of Massachusetts that she used to take very seriously her self-determined mission of civic betterment. She still has numerous societies that seek to perform such public service, but the ballot reveals too often

the subversive alien thought. That seriousness of purpose in the Bay State has written many pages into the history of American progress. The interesting thing for us, as Southern people, in that seriousness of endeavor, is the example it affords of self-conscious determination that led to important achievement.

The South is American. Furthermore, it must remember, day and night, that it is American; that it has a great mission to perform in holding fast to and fomenting the noble ideals of this free republic. In these things she must take herself seriously, with full and abiding consciousness of her opportunity. She must direct her own destinies by developing the spirit of leadership, accompanied by intensive training of the young to strengthen that spirit with the knowledge of those things that make for modern progress. Her leadership must possess the assurance of efficiency.

The South still has an undeveloped empire to direct into economic utility for sustaining her natural increase of population. With enormous mineral resources, with a vast acreage suited to agriculture, and with great areas of cut-over lands to improve by reforestation, she has that final certainty of civic and industrial eminence that goes with an inheritance of marvelous but only partly developed water-power. The Northern states have developed about 70 per cent of their available power, while the South has harnessed only about 28 per cent of its potential resources. The total minimum available Southern water-power is 3,456,000, as against 3,057,000 horsepower in the chief industrial group of Northern states. No better measure exists than this for the possibilities of growth.

The late Ambassador Walter H. Page, though hailing from North Carolina, was a man of such cosmopolitan experience and understanding as to interpret the future without bias. Referring once to the movement of the center of population in the United States, he placed his finger on the map and said: "That point, now close to Columbus, Ind., will move southward, and I should expect it to turn finally toward the Appalachian region of the South. There lies the water-power of the future; there are the raw materials for a complex manufacturing industry; there are fertile lands capable of producing foods cheaply to feed teeming millions; there is an open all-year climate and the healthiest country on earth. It will be the ultimate center of American industry."

He might have added that it is the stronghold of pure Americanism, of healthy thought, of the traditional ideals on which the greatness of this country rests.

The South and Reconstruction

By R. H. Holliday, President of Oxford College, Oxford, N. C.

*[The people of this generation know very little about Reconstruction Days from 1867 to 1876, and the control during that time of Southern legislatures by "carpet-baggers," who today would be called Bolshevists, and ignorant negroes put into office by these "carpet-baggers." It is proper, therefore, in this publication to give some historical facts about that reign of misgovernment and robbery in order that the handicap under which the South so long labored may be the better understood.—*Editor Manufacturers Record.*]*

There is no more pathetic picture in all history than that of the Southern soldiers, released by their generals, trudging their weary way homeward through a country that had been made desolate by war. It is a gruesome story, almost too much to be believed, and it need not be repeated. In the language of the Queen of Sheba: "The half has never yet been told." The story is completed in the Reconstruction period, through which the South was forced to pass from 1867 to 1876, when there was an effort to turn the social, industrial and political pyramid upon its apex—the foulest blot in human history. Muzzey says: "Thus by the Reconstruction Acts of 1867 Congress deliberately forced negro suffrage upon the South at the point of the bayonet. It was a violent measure for Congress to adopt, even though the conduct of the states of the secession in rejecting the Fourteenth Amendment was sorely provoking. The negroes outnumbered the whites in the states of North Carolina, Alabama, Florida, Louisiana and Mississippi. They were, with few exceptions, utterly unfit for the exercise of political rights. Even the colored men of the North, far in advance of their Southern brothers who labored in the cotton fields, were allowed the suffrage in only six states, where they counted as the tiniest fraction of the population. Ohio, in the very year that Congress was forcing negro suffrage on the South (1867), rejected by over 50,000 votes the proposition to give the ballot to the few negroes of that state. Conceding that Congress had the right to impose negro suffrage upon the South as a conqueror's privilege, it was nevertheless a most unwise thing to do. To reverse the relative position of the races in the South, to set the ignorant, superstitious, gullible slave in power over his former master, was no way to insure either the protection of the negro's rights or the stability and peace of the Southern governments."

R. H. Holliday

In the closing words of his inaugural address Lincoln said:

"With malice towards none, with charity for all, with firmness in the right, as God gives us to see the right, let us strive on to finish the work we are in; to bind up the nation's wounds; * * * to do all which may achieve and cherish a just and lasting peace among ourselves and with all nations."

Lincoln's plan of Reconstruction, if a definite plan can be ascribed to him, was human—certainly so in comparison to the Congressional plan of 1867. He acted upon the hypothesis that there was a large loyal element in the seceding states, and through this nucleus he proposed to reconstruct the South. He adhered to this theory throughout the war. In 1862 he appointed military governors in North Carolina, Tennessee and Louisiana, whose business it was to increase the nucleus of the "loyals" that were then in these states. In 1863 he appointed a military governor in Arkansas, and in Virginia he favored the organization of the western counties into a union. This union of the western counties finally developed into the state of West Virginia. In other states he likewise took active steps, but in the Congress there was a growing aversion to the Lincoln idea of Reconstruction, so in

1864 the Wade-Davis bill was passed, providing for Congressional supervision of Reconstruction and proposing to set aside the work already done by Lincoln. This bill Lincoln pocketed and there it died.

Lincoln's plan was largely embodied in his proclamation of 1863, and in this he proposed to recognize any state in which 10 per cent of the voters of 1860 organized and took the oath of allegiance to the Union.

Johnson, at the death of Lincoln, succeeded to the Presidency. He undertook in good faith to follow Lincoln's plan to the letter, but met with consummate failure, and over his veto in 1867 the Congressional plan was passed. In January, 1867, unconditional suffrage was granted to the negroes in the Territories and in the District of Columbia. The Reconstruction Act passed in this same year declared that no legal government existed in the South, and divided it into five military districts.

Over each of these an Army officer was to rule by martial law. Any of these states might avoid this rule by organizing, granting to the negroes full suffrage and completely disfranchising the leading whites.

When the whites indicated that they preferred martial rule to negro rule, Congress passed another act on March 23 by which they directed the generals to make a registration, including the blacks but excluding the leading whites. They were instructed to hold elections for the purpose of electing delegates to a Constitutional Convention. This convention framed a constitution which was then to be submitted to the people for ratification, and this constitution, if ratified, in turn was to be transmitted to the Congress. These elections were under the supervision of the Army officers. No one who had given aid to the Confederacy was allowed to take any part in the registration. Those who had held civil offices, and especially those who had reached high command in the Confederate Army, were disfranchised. It is very evident from the foregoing that the substantial element of the white population was denied any voice in framing the fundamental law by which they were to be governed. There was hardly a man to be found who had not aided the Confederate cause in some way. It is quite obvious that it was the covert design of the Congress to turn over to the negroes, scalawags and carpet-baggers the government of the South.

These scalawags were little better fitted to rule than the negro. They were strongly prejudiced against these disfranchised Southerners and gloried in seeing them crushed into the very dust. The "carpet-baggers" were men from the Northern states—so called because they brought all of their belongings in a cheap carpet-bag suit case. They were adventurers—out for what they could get out of the deal in many cases. They were the Bolshevists of that day, and as vile as the worst Bolshevists of Russia.

It is no wonder, then, that some of the darkest deeds in history were perpetrated upon a helpless and prostrate people. Among the many pernicious acts of Congress relating to the negro, the one creating the Freedman's Bureau is noteworthy, concerning which the following is taken from the records of the Forty-second Congress:

"Even while the Federal Government was administering their affairs through direct agencies from Washington, they were oppressed and plundered by the Freedman's Bureau agencies, by the cotton thieves and the military to an extent only exceeded by the 'carpet-bag' local governments which superseded them.

"First, as to the Freedman's Bureau and its operations. By this act four millions of negroes became the pupils, wards, servitors and pliant tools of a political and extremely partisan agency, inimical and deadly hostile to the peace, order and best interests of Southern society. * * *

"The agents of the Freedman's Bureau were, as we have shown before, generally of a class of fanatics without character or responsibility, and were selected as fit instruments to execute the partisan and unconstitutional behests of a most unscrupulous head. Thus the negroes were organized into secret political societies known as Loyal Leagues, in which organizations they were taught that their former owners were their worst enemies, and that to act with them, politically or religiously, would certainly result in their re-enslavement. A regulation of this Bureau required all agreements for service between whites and blacks to be signed and witnessed in the presence of, and left in the custody of, the agent. It was a common practice, after a planter or farmer had contracted in the required form with the freedmen for the year, had his crops planted and in process of cultivation, that his negro laborers would strike for higher wages. Nothing but the intervention of the Bureau agent could induce them to return, and that inducement could only be effected by the planter or farmer paying to the agent from $10 to $20 per head. This sum was simply a perquisite of the agent, and when paid the negro always returned to his labors, though not receiving a cent of additional compensation. * * * These Bureau agents had authority to order the arrest and imprisonment of any citizen on the single statement of any vicious negro, and if any resistance was made to the mandates of the Bureau agent, the post commandant, or military governor, was always ready to enforce it with a file of bayonets. * * *"

From 1867 to 1870 is probably the period during which there was the most profligate and wanton misrule in the South during the Reconstruction period. It is estimated that during these years the state debts increased $131,000,000. In North Carolina the debt increased from $16,000,000 to $42,000,000, while the assessed valuation of the property was only $120,000,000. The bonded debt of South Carolina in 1867 was $5,800,000; five years later it was $24,000,000, while other obligations were so numerous that no estimate of them was ever made. In Alabama, during the six years of "carpet-bagger" rule, the debt increased from $5,000,000 to $30,000,000. No accurate total has ever been made of the debts accumulated during the Reconstruction period in Louisiana; however, the state soon went into bankruptcy. The bonded debt of $10,000,000 in 1867 was increased to $48,000,000 in 1870, and in addition to this a $30,000,000 local indebtedness, or 30 per cent of the value of the state property. For these extravagant expenditures there was not one iota to show in new public buildings or improvements. The schools were closed; the deaf, the dumb and the blind were uncared for; protection to person and property was not given; the money wrung from the impoverished people or secured by mortgages on the future unborn generation went into the pockets of unscrupulous adventurers.

"The South Carolina Legislature in one session spent $95,000 for furniture, $80,000 worth of which went to furnish the rooms and dwellings of members. This legislature also paid the private accounts of its members. Hundreds of thousands of dollars were spent for eatables and drinkables, from bacon and hams to pate de foie gras and winter fruits; from the best champagne to the worst rum. Clothes, books, coffins, mules, horses, cigars and hundreds of other such articles were paid for as legitimate supplies. The members charged to the state such articles of apparel as skirts, bustles, false hair, fascinators, lace, thread, ribbons and perfumes. One legislator said 'South Carolina ought not to be a state if she cannot support her statesmen.' The public printing of South Carolina cost

more during one 'carpet-bagger' administration than for the previous 70 years." The South Carolina Legislature appropriated $700,000 with which to buy land for negroes who were clamoring for their "forty acres and a mule," but they purchased only $50,000 worth, and the rest of the money went into the pockets of the buyers and sellers. For the purpose of redeeming $500,000 worth of state bank notes the legislature appropriated $1,250,000, and the securities belonging to the educational fund were sold for the use of the state government.

During the Reconstruction period in seven of the Southern states there were four Governors, ten Senators and twenty-five of the thirty-five Representatives "carpet-baggers," and the rest were scalawags and negroes. It was the same way in the county administration. The state legislature was composed mainly of incompetent whites and negroes controlled by unscrupulous leaders. The South Carolina Legislature had 88 blacks and 67 whites, all of whom paid $635.23 in taxes, 91 paying none at all. In Alabama the members of the legislature paid less than $100 in taxes. The other legislatures were similarly composed.

Warmoth, a native of Illinois, who was dismissed from the Union Army by Grant, went to Texas in 1865 and was indicted there for the embezzlement and misappropriation of Government cotton. After this prosecution he went to New Orleans. During the Reconstruction of Louisiana he was elected a delegate to Congress, each voter depositing with his ballot fifty cents to defray Warmoth's traveling expenses to Washington. He had been governor for four years at an annual salary of $8000, and testified that during the first year he made more than $100,000, and he stated before a Congressional committee in 1872 that he was then worth between $500,000 and $1,000,000. The following is an itemized statement of some of the expenses during his administration as Governor of the Commonwealth of Louisiana:

1868 from July	$3,837,877.74
1869	4,294,677.16
1870	7,131,202.11
1871	6,425,831.50
1872	4,704,983.65
Total for four years and five months	$26,394,572.16

Under Warmoth the state administration had added to the city and state indebtedness of Louisiana $54,325,759, with nothing to show for it. The cost of these four years and five months of misrule was, therefore:

Money actually expended by state	$26,394,572
By local bodies (partly estimated)	25,300,000
Increase in debt (state and local)	54,325,759
Total cost four years and five months of carpet-bag misrule	$106,020,331
Amounting per year to	$24,040,089

The foregoing statements will give the reader some idea of the extravagance of the Reconstruction period. Limited space will not permit further mention, but I venture to quote the incident of the "Painted Pegs":

"I can tell you from what I know and have seen myself, and also from what negroes have told me, that they have been promised lands and mules—40 acres of land and a mule on divers occasions. Many an old negro has come to me and asked me about that thing. I can illustrate it by one little thing that I saw on a visit once to Gainesville, Sumter county, Alabama. At a barbecue there I saw a man who was making a speech to the negroes, telling them what good he had done for them; that he had been to Washington city and had procured from one of the departments certain pegs. I saw the pegs. He had about two dozen on his arm; they were painted red and blue. He said that those pegs he had obtained at a great expense to himself; that they had been made by the Government for the purpose of staking out the negroes' 40 acres. He told the negroes that all he wanted was to have the expenses paid to him, which was about a dollar a peg. He told them that they could stick one peg down at a corner, then walk so far one way and stick another down, till they had got the four pegs down; and that, when the four pegs were down, the negroes' 40 acres would be included in that area; and all he had to say to them was that they could stick those pegs anywhere they pleased—on anybody's land they wanted to, but not to interfere with each other."

It is not the purpose of this article to intensify sectional feeling or to arouse bitter animosity between the so-called North and the South. Rather I would assuage that bit that remains. Today the Southerner is just as proud of Old Glory as she gently wafts her silky folds upon the wings of Zephyr as any man from any section of the United States. He is just as proud of the Union, he basks in her glory as much as anyone and he responds to her call just as quickly and as unselfishly. This was exemplified beyond peradventure in the wars of 1898 and 1917. No genuine, red-blooded Southerner regrets that the Union was preserved; he fought then for what he conceived to be his rights, just as he fought recently in the World War at his country's call. The main purpose of this article is to show that the South went down into disastrous defeat and rose again.

What few industries the South had had been literally obliterated, and in thousands of cases there was nothing but the chimney of the old house to greet the returned soldier. In the face of these discouraging obstacles, he set himself grimly to the task of rehabilitating his old home. He did not look to the outside world for succor nor did he ask for long-term loans. He was no pauper, although penniless. His assets consisted mainly in that same dogged determination with which he fought under the Stars and Bars. His greatness lay within him, as it must perforce do in all people. He was no coddler, neither would he accept the coddling of the other party. What he wanted now was a chance—a chance to rebuild what the engines of war had destroyed.

Since those sad and disconcerting days of Reconstruction no section in the United States has advanced more rapidly than the South, taking into consideration the difficulties that confronted it. You will find in some of these very states some of the best colleges and universities in the United States. The public schools are flourishing, and there is a public high school in every nook and cranny of these various states. The Southerners are right on the top in the manufacture of cotton and tobacco, and in many other things they surpass. It is now 59 years since the war ended and only 48 since the heavy blanket of despair, thrown over them during Reconstruction, was removed.

It appears that there is a lesson in this great comeback for those European countries who are looking to America and other countries to bear their burdens. An individual who looks to another for things for which he should look to himself is a mere pigmy; he is mentally dwarfed and his initiative, individuality and power are atrophied. History indicates that this same rule applies to nations. Europe's salvation lies within herself.

Southern Historic Homes—The Birthplace of American Government

By Henry E. Harman, Editor Southern Architect and Building News, Atlanta, Ga.

Somehow the hand of Romance touches with enchanting fervor everything that is Southern in American life. This was true in the colonial period as much so as it is true today.

In the early years of American history there was a predominant drift to our Southern shores of aristocratic English, French and Spanish families, tempted here, no doubt, by glowing tributes to our warm climate brought back by the early explorers, who supposed that the tropical beauty of the South meant not only a most delightful place for residence, but indicated as well the evidence of untold mineral wealth, such as had been found in Mexico and South American countries.

Henry E. Harman

We, therefore, find among the early settlers men not only of the highest social standing abroad, but those of great material wealth, especially among the pioneers who located in Virginia, South Carolina, Louisiana and other sections.

As evidence of this, many of the early colonial homes were constructed of brick and other material brought over from Europe, and these were equipped throughout with furniture from the other side, which could only be afforded by men of wealth and appreciated by those of exquisite taste.

Thus the very foundation of life among our early American settlers in the South had its inception among families who wielded a powerful influence wherever they located, and this influence was felt and made secure during the entire period up to the breaking out of the Civil War. It is a fact that during that pre-war period the Old South was a leader in all phases of early American activities.

The institution of slavery in the South gave this section a wonderful advantage in the accumulation of wealth. The invention of the cotton gin made cotton growing a most profitable occupation. On the large plantations the planter lived and ruled like a feudal prince. His slaves were numbered by the hundreds. His home was the gathering place of the best families, and, as a consequence, the social amenities reached a stage of perfection unknown elsewhere in this country. The planter's sons and daughters were educated abroad. Their training was the very best that money could buy. These young people returned from Europe fitted to take the highest places in social affairs, and it is an undisputed fact that in Washington, Saratoga and other places where the best families gathered the Southern people were always the leaders and dictated the social trend in this country.

What was true in this respect was equally true in politics and statesmanship. Everyone who understands American history knows that in the sixty or seventy years preceding the Civil War Southern statesmen were the leaders in the political life at Washington. Our great men excelled in oratory and practically dictated the political life of the nation. One has but to look over the list of Presidents sent to the White House from Virginia and Tennessee alone in those early years of the nation to see how completely the Old South controlled our national affairs. Beginning with Washington, the list of Presidents from the South is really amazing, including such names as Washington, Jefferson, Madison, Jackson, Monroe, Polk, Tyler, Harrison, Johnson and others. But for the Civil War, which was necessary to destroy slavery on account of its deep-rooted hold upon our people, the list of White House occupants from the South might have been doubled by this time.

In the heyday of the South's glory, the rich Southern planter went to Saratoga or the Greenbrier, White Sulphur Springs, the rendezvous of social life for the country. He was a scholar and a gentleman, and his wife and daughters wore the latest dresses which the best shops of Paris could furnish. This Southern influence dictated the social life of those famous resorts. The Southerner's say was the last word in social etiquette.

While this article is not supposed to deal with the literary side of Southern life during its formative period, it might be well to touch upon the subject, inasmuch as, it has been claimed, that the Southern people did not care for books and that New England people were the creators of our literature.

In response to this suggestion it might be well to say that sentiment, poetry, music and the love of books go hand in hand and, therefore, as a matter of fact, the average Southerner is a lover of literature. As a matter of record it might be mentioned that from 1831 until 1864, when the exigencies of war of necessity put it out of business, the Southern Literary Messenger was the leading literary magazine in this country, covering the long period of one-third of a century. During all those years the paper was published at Richmond, Va., and for a long period was edited by Edgar Allen Poe. Perhaps no other literary paper in this country ever had a more distinguished list of subscribers—these being made up mostly of wealthy planters in every Southern state. Considering the early period of its publication, The Messenger was an unusual literary magazine, keeping fully abreast of the times in high contributions from the best writers of the times. The writer, fortunately, owns a complete file of this magazine from the first issue until the last, and I can certify as to its high literary character. Unless the Southerners were appreciative of the very best literature such a magazine could not have existed over such a long period of thirty-three years without a break in its publication.

A careful study of Southern colonial architecture is most interesting. Coming as most of our early settlers did from colder climates, it is worthy of notice to see how sensibly these early peoples planned their homes to meet the requirements of climatic conditions. The typical homes of the Old South, from Virginia to Louisiana, were planned not only with a view to meet the conditions of climate, but there was a silent dignity and beauty about them which have been copied in all parts of the world. The high ceilings, wide verandas, usually extending two stories, and broad stairways made these homes of a distinctive character, shared by no other type of architecture.

Types of Virginia

"Brandon"- one of show places of the Lower - James.

Shirley - where mother of Robt. E. Lee was born.

Monticello- Thomas Jefferson's Home.

Mt. Vernon - Geo. Washington's Home.

"Kenmore"- home of Bettie Washington Lewis.

Colonial Homes

Westover - built in 1730 - camping ground of Benedict Arnold and Lord Cornwallis, 1781.

Sabine Hall on Rappahanock River.

Stratford - birth place of Gen. Robt. E. Lee.

Arlington - home of Gen. Robt. E. Lee.

Rosegill - Middlesex Co., Va.

These old homes in the South, now becoming fewer year after year, were typical of the men who built and occupied them. Agriculture was the main business of the colonial period and the years prior to the Civil War. The planter was a gentleman of wealth, and the cost of the building did not enter into the matter at all. And yet these people had such excellent taste that there was no display of ostentation; each home was simple in all its plans, yet no expense was spared which would add to the comfort of its occupant.

Perhaps the planning of the surroundings of these homes came nearest to anything like the display of wealth; shrubbery, flowering plants and trees of every kind made a picture of rare beauty—in the midst of which all of these old-time homes stood. And yet these rare old grounds and gardens were only in keeping with the home which they environed, like the frame of some rare painting.

It was in these old homes that American hospitality reached its zenith in the pre-war years. It was far different from the new-rich social atmosphere which prevails today of "give and take, pay and pay back." I well recall a tradition in our own family which illustrates this point. My grandfather was a large planter near Columbia, S. C. His brother was also a planter in the low country, near Charleston. It was before the day of railroads and the old tapestried carriage was the only method of transportation. Regularly, twice a year, each brother, with his entire family, paid a visit to the other and his friends. It required two or three carriages to convey each family in comfort and several days to make the trip of 140 miles. Yet for many years these pilgrimages were made regularly and most delightful they were. Distance and discomfort could not deter either from keeping up the tradition of social and family obligations.

When we come to the historic value of colonial homes in this country, we find that the South was easily a leader. This is true from the standpoint of history and also from the point of architectural beauty. Of all the states playing a part in this discussion, Virginia took the lead. Down on the Potomac River Mount Vernon stands where the immortal Washington spent the last years of his life. The history of this famous home is too well known to need repetition here. Its entire history is crowded with incidents of national importance, which every school boy knows.

Not so far away to the southwest is "Monticello," where Thomas Jefferson wrote the Declaration of Independence and where he lived the placid life of a country gentleman and yet into which were crowded so many incidents of national importance, making it, perhaps, one of the most noted places in this country.

The earlier history of Virginia is intimately associated with that small stretch of country lying along the James River from Jamestown to a point above Richmond. Almost every mile of that section is rich in early American history—so rich in that respect that the entire region should be cared for and preserved. Along the James River and near by stood such famous country estates as "Shirley," where the mother of Robert E. Lee was born. Here, also, is "Westover," built in 1730 by William Byrd, popularly known as the "Black Swan of Virginia," and which became the camping ground of Benedict Arnold and Lord Cornwallis in 1781. Close by is "Berkeley," a famous estate built in 1681. This later became the home of the Harrison family, where Gen. William Henry Harrison wrote his inaugural address. It is said that every President of the United States from Washington to Buchanan was at sometime a guest at "Berkeley." Of course, Jamestown is part of this famous region, and "Brandon," one of the show places of the lower James, is also located here.

West of Richmond, on the James, stands "Tuckahoe," one of the oldest of Virginia estates. "Tuckahoe" now belongs to the Randolph family. "Curl's Neck" is also here, getting its name from the twisting turn of the river. It was on this estate that Nathaniel Bacon and William Randolph concocted the inglorious Bacon's Rebellion.

Less than ten miles from the James River, inland, is situated Williamsburg, and while not celebrated for any buildings of architectural beauty, it is one of the most historic places in this country. William and Mary College was established here in 1693, named after the English King and Queen, and perhaps more distinguished men have been educated there than from any other college in this country. Three Presidents of the United States took their training there—Washington, Jefferson and Monroe. This was the first American college to start the elective system and the first college fraternity was launched there, the Phi Beta Kappa. Among the famous houses at Williamsburg are "Bassett Hall," the home of President Tyler, and in which house Thomas Moore wrote "The Fire Fly"; the "Peachey House," where La Fayette was entertained; the home of Peyton Randolph, President of the First Continental Congress, and the Moore house, in which the terms of the surrender of Cornwallis were drawn. "Carey House," the home of Washington's early sweetheart, is also located there, in addition to others.

At Fredericksburg, Va., is located the famous "Ken-

Pringle Residence, Charleston, S. C.

General Grant's Headquarters in Natchez, Miss.

Brewton House, Charleston. Built in 1760

more House," now taken over by the Daughters of the Revolution, and which has become a shrine and is visited by thousands annually. Here also is the "Mary Washington Home," also the "Rising Sun Tavern" and others. At Yorktown, near by, are a number of old homes, many of them of famous historic value.

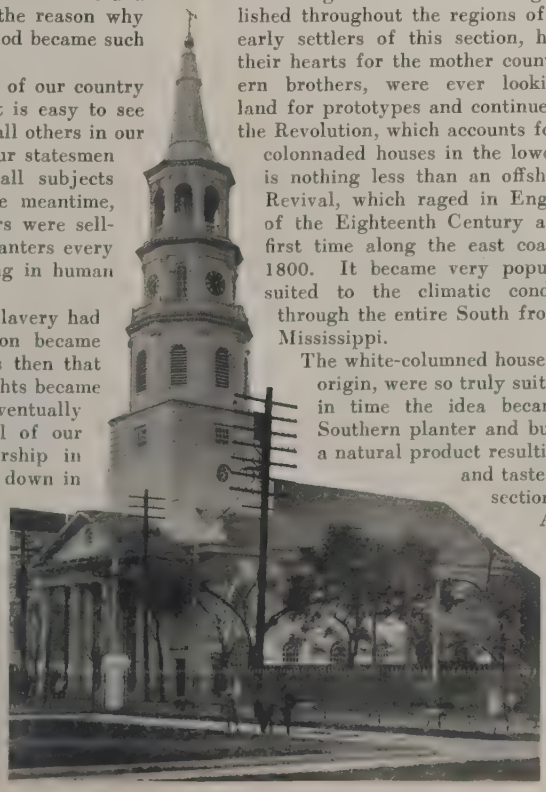
In our early architectural history South Carolina ranked among the leading of our Southern states, especially in homes possessing historic interest. During those early years Charleston was a city of marked importance, having been originally settled by old, aristocratic families from both England and France. It is a well-known fact that the Charleston people considered those from other sections as "barbarians," these barbarian settlements applying to both the peoples from North Carolina and Georgia.

During those early years there was an old saying that "Civilization does not extend beyond the tidewater section." The larger plantations, with their hundreds of slaves and thousands of acres of fertile land, were all located in what was known as "the low country." The land was level, very rich, and vast crops of cotton, rice and corn were grown. In a way every plantation was a feudal estate, the head of which and his family lived like royalty. All along this coastal country, extending from Virginia, down the Atlantic seaboard and around the Gulf section to lower Louisiana, stood these fine old country homes, equipped with every comfort which could be bought at that time. A great many of these homes were built of imported material and most of the furnishings came from the same source. Most of the labor was done by slaves many of whom were good mechanics. Their wealth gave these people ample time for reading, study and cultivation of the intellect. These old-time planters, therefore, became leaders in statesmanship, in our social life and in every branch of learning. That is the reason why so many Southerners in the pre-war period became such a power in the affairs of the nation.

If one will study the political history of our country for the first half of the last century, it is easy to see how our Southern politicians easily led all others in our National Congress. During that time our statesmen made the most brilliant speeches on all subjects which came up for discussion. In the meantime, however, the New England slave traders were selling thousands of negroes to Southern planters every year and making vast profits by trading in human beings.

It was only a question of time when slavery had to be abolished, and this great question became more acute from year to year. It was then that the overshadowing question of states' rights became the foremost problem with us, and this eventually led to the Civil War, under which all of our Southern wealth, education and leadership in finance, social and political power went down in a crash—one of the most appalling disasters that ever befell a proud and distinguished people, aside from the question as to whether the South was right or wrong.

In a limited territory there were more and finer colonial homes in the vicinity of Charleston, S. C., than in any other one section of the South. From its earliest history the old city built and kept up a number of model homes, all of them designed by the best architects and constructed of the very best material.



St. Michael's, Charleston, S. C.

Among a few of the famous homes were such as the "Thomas Bull" house; the "Holmes" residence on the Battery, which was built by James Gadsden Holmes, Sr. There is the "Simonton" home, 1740-1770, since owned by Mr. J. Adger Smythe; the "Henry Laurens" house, President of the Continental Congress, with its broad verandas; also such notable homes as that of Lord William Campbell, "Hayne" house, "Rhett" house, "Miles Brewton" home, "Pringle" home, "Heyward," "Manigalt" and scores of others.

Two famous churches in Charleston are St. Phillip's, built in 1834, and St. Michael's, in many respects the most famous church in this country, with its string of romantic and historic events.

"Friendship," near Georgetown; "Mulberry Castle," on the Cooper River; "Parson's Plantation," on Gooseneck Creek; "Prospect Hill," on the Waccamaw, and "Drayton Hall," on the Ashley, are all famous in history and romance; also "Hampton," between Georgetown and Charleston, where Washington was a guest in 1791.

It would be far beyond the limits of this article to attempt the romantic and historic stories which cling to most of these famous old homes, whose lovers and heroes still move in silence about their broad verandas and high-ceiled rooms, tell their stories of undying love and plan their heroic actions, which have helped to make dazzling history in the affairs of our nation.

The early architecture of Georgia, like that of Alabama and Mississippi, was subject in a large degree to the influence exerted by two distinct nationalities—the French and English. The English settlers who came South were, as a class, much richer than the French Huguenots of the same period, and naturally were able to build finer houses than the less fortunate French settlers, and we find that the Georgian ideas of the English were well established throughout the regions of the far South. The early settlers of this section, having less hatred in their hearts for the mother country than their Northern brothers, were ever looking to their mother land for prototypes and continued to do so even after the Revolution, which accounts for the presence of the colonnaded houses in the lower states. This style is nothing less than an offshoot from the Classic Revival, which raged in England during the last of the Eighteenth Century and appeared for the first time along the east coast of America about 1800. It became very popular, and, being well suited to the climatic conditions, soon spread through the entire South from the Atlantic to the Mississippi.

The white-columned houses, although of foreign origin, were so truly suitable to the South that in time the idea became absorbed by the Southern planter and builder as to be almost a natural product resulting from the demands and taste of the people of this section.

Among the notable old homes in the state of Georgia may be mentioned "Inglehurst," near Macon, and "Stafford" homestead at Madison; the "Calhoun" house, near Newnan, and the old "Bullock" home at Savannah. "Greenwood," be-

longing to the estate of the late Thomas P. Jones, is located at Thomasville, Ga. It was designed by John Wind, a famous English architect, and was described by Stanford White as one of the finest examples of

Old Governor's Mansion, Milledgeville, Ga.

Greek architectural revival in America. It was begun in 1833 and was completed nine years later, 1842. Near Atlanta is the old "Bullock" home, in which President Roosevelt took so much interest during the later years of his life because of its close relationship to his family. A rare type of architectural beauty is the portico of the old "McAlpin" house in New Orleans, and another of almost similar design is "The Hermitage," on the Savannah River, and the old Governor's Mansion at Milledgeville, Ga.

In a paper of this character, devoted to the early architecture of the entire Southern section, it is practically impossible to deal with the many beautiful homes in the South without exceeding the limits of the space allowed. To do that would require an entire book devoted to this subject alone.

In the lower Mississippi Valley there are yet standing many old colonial homes, intermixed with both history and romance. That section was somewhat cut off from the rest of the South in the early days, but the natural fertility of the soil and the general abundant resources

Devereaux, Natchez, Miss. Built in 1830

made it a prosperous locality. Long before the general exodus of emigration to Texas and the far West there sprung up many prosperous sections, especially in Alabama, Mississippi and Louisiana, with New Orleans as

"GREENWOOD"—THOMASVILLE, GA., BUILT IN 1833. PHOTOGRAPH TAKEN MANY YEARS AGO
Note Size of Boxwoods

the general trading center. Planters who went to that section found awaiting them opportunities for accumulating wealth of which they had never dreamed, and those who were fortunate enough to go first found a veritable El Dorado to welcome their arrival. The history, therefore, of those pioneer soldiers of fortune thrills with romance and good luck.

In that section, especially in Mississippi, there are a number of rare old homes, nearly all of which have a bit of history or romance, or both, mixed into their making.

In that section, which is now the lower part of the Mississippi, stands an old home known as "Windy Hill Manor." It was part of a large plantation estate, and in this house Aaron Burr took refuge after his dream of creating a Southwestern empire with Harman Blennerhassett fell to the ground. Burr was trying to escape to South or Central America, but the eyes of the Government followed him, and at "Windy Hill Manor" he was captured and taken to Virginia for trial. The result of that trial is well known to every student of the early history of our country.

Not a great distance away stands another house, of the old colonial type, which was the home of Winthrop Sargeant, the first Territorial Governor of Mississippi. It belongs to the old colonial type and was known as "Glosster." This house was afterwards owned by Sargeant S. Prentiss, a well-known character in the early history of that section.

Weeks Hall, New Iberia, La. In the "Evangeline Country"

Near Natchez is the famous colonial house known as "Somerset." It stood in a grove of wonderful magnolias and other native trees, and was occupied by an English officer, Major Schotaol, who was in the employ of the Spanish governor at that time. "Somerset" belonged to that type of colonial architecture so popular at the time in that section—with wide verandas, running the entire length of the building. Another famous country place near Natchez was "Dunleith," which occupied the site of the building over which the American flag was raised in the Mississippi territory after we acquired that section from Spain. Here also was "Concord," the residence of the old Spanish Governor of Mississippi, which was unfortunately destroyed by fire in 1902. Natchez also claimed two other historic homes, one of these being "Magnolia" and the other "Waverly." Not far from Natchez, on a high point of land near the river called the "Bluff," was the home in which Jefferson Davis was married to Miss Varina Howell in 1845, sixteen years prior to the breaking out of the Civil War.

The Hermitage, Nashville, Home of Andrew Jackson

Three other historic houses are located at Natchez, Miss.—"Springfield," built in 1820; the "Fish Home," erected in 1830, and "Oaklawn," built by Judge Alexander Parker in 1817. At New Iberia, in the Evangeline country, is "Weeks Hall," on Bayou Teche, which was selected by D. W. Griffith as the ideal spot in making the picture, "White Rose," which was so popular as a screen success.

Throughout the entire Southern territory there are scattered many beautiful homes, all of which should have a place in this article. But, as stated above, this is hardly practical, and we can therefore only deal with the subject as the space will admit.

For instance, one of the most beautiful examples of a

Spence Residence, Tuscaloosa, Ala.

Van Vlecht Residence, Memphis, Tenn.

Shorter Residence, Eufaula, Ala.

country gentleman's estate is "Ashland," the home of Henry Clay in the bluegrass section of Kentucky; also the famous Van Vhlect home at Memphis. Another type of the early colonial is "Montpelier," the home of James Madison. Still another is "The Hermitage," near Nashville, Tenn., where Andrew Jackson, "Old Hickory," spent the early and later years of a life filled with romantic activity. "Concord," "Tudor Place" and "Friendship," all near Washington, D. C., belong to the finest types of the colonial architecture, and about each of which there hangs the mysterious glow of historic incidents. Away down in Alabama, in an out-of-the-way locality, yet in a fine state of preservation, stands "Gainswoods," whose history is intermixed with the romantic career of Napoleon Bonaparte. In Loudon county, Virginia, the traveler will find "Outlands," a beautiful type of the colonial period, and not far away, near Richmond, "Sabine Hall," famous both in history and romance.

And when we consider the political influence which the South exerted in the olden days it is an easy matter to sum up the powerful part she played in the making of the nation. If she led in social and industrial affairs, it goes without dispute that she led the nation so far as political power is concerned.

To show this power politically it is only necessary to glance at the history of the nation during the first half of the last century. George Washington was our first President; that is, from 1789 to 1797. Then came John Adams, a Northern man, with one term, from 1797 to 1801. Thomas Jefferson served from 1801 to 1809, two full terms. James Madison followed, from 1809 to 1817. James Monroe came next, serving from 1817 to 1825. Following Monroe was John Quincy Adams, from 1825 to 1829. Andrew Jackson, a native of South Carolina but elected from Tennessee, served from 1829 to 1837. Following him was Van Buren, who filled the office from 1837 to 1841. William Henry Harrison, a native of Virginia, succeeded Van Buren, but only served one month, the term being filled out by John Tyler of Virginia, who served until 1845. He was followed by James K. Polk of Tennessee, who filled the office until 1849. The next four years were held by Zachary Taylor and Millard Fillmore. Then came F. Pierce, 1853 to 1857, and James Buchanan, from 1857 to 1861.

From the above historic facts it will be seen that from the date of Washington's inauguration in 1789 down to the tragedy of Fort Sumter—covering a period of some seventy years—the North held the power in Washington, D. C., for only twenty-four years, while Southern Presidents occupied the White House during the balance of the time, covering a period of 48 years. Not only was Southern power felt in the Presidential chair, but in both houses of Congress our statesmen ranked among the highest, with a force which has never been disputed.

Thus, after more than half a century, the finger of history points with unfailing exactness to the wonderful influence which the land of Dixie has played in the making of a nation.

TYPE OF COLONIAL SOUTHERN HOME OF THE LOWER SOUTHERN STATES SURROUNDED BY MOSS-FESTOONED LIVE OAKS

Amazing Hotel-Building Progress

Two Hundred and Fifty Million Dollars Thus Invested in 1924 in Building 614 Hotels—A Striking Contrast Between Massachusetts and Virginia Hotel Laws in Colonial Days

By E. J. Williamson, Associate Editor The Hotel Gazette, New York, N. Y.

Southern hospitality is a tradition, as well as an existent reality, that dates back to colonial days, and to get at the beginning of it one must needs dig into musty volumes in historical archives. There one will discover that the pioneer Southerner was of such a hospitable nature that he practically legislated hotels out of existence. At least that is what happened in the Old Dominion, according to Berkeley's "History of Virginia," and it is not at all unlikely that the same thing happened in other portions of the Old South in early days.

E. J. Williamson

Whereas Massachusetts had a law prohibiting anyone but licensed innkeepers from providing travelers with bed and board, Virginia, Mother of States, had a law exactly opposite. It provided that unless a traveler himself stipulated that he was to pay for his board and lodging no charge should be demanded of him, no matter where he stopped or how long. Nor did it matter whence the the traveler came or whither bound, whether he was known or unknown, prominent or obscure.

The spirit of hospitality must surely have been an innate characteristic of the early Southerner, else such a law would not have been adopted. He did not welcome the lonely wayfarer to join the family circle and share its food and shelter for purposes of commercial gain. To have offered money or other payment for this hospitality would have been an insult. Stray travelers, bringing with them the news and gossip of distant cities and colonies, were welcomed with open arms. Their company was highly prized. Some of the planters, we learn, even went so far as to install slaves along the highways to invite passing strangers to stop with their masters overnight.

Innkeepers would, of necessity, find little business under such conditions, and it is not strange that there were practically no inns or taverns in the South until several years after the Revolution, when conditions began to change and travel to increase. Only such cities as Richmond, Baltimore, Charleston, Savannah and a few other places had inns. There were none at all along main traveled roads. However, as the country began to develop and travel increased, inns began to spring up all through the South, and many of these inns, as in other parts of the country, are rich in historic interest. Many of them, as, for example, the old Swan Tavern at Richmond, continued in business down to Civil War days. Thomas Jefferson was a frequent patron of the Swan, and another famous Jefferson — Thomas Jefferson of "Rip Van Winkle" fame—lived there with his family in 1857 when he was manager and member of a stock company. The old Swan has still other claims to distinction, chief of these being that Edgar Allen Poe was a familiar figure under its roof during that period when he was contributing editor of the "Southern Literary Messenger."

The old Swan Tavern was built about 1780 and, like all early American inns, it was copied after the inns of Old England. This type of inn predominated until the days of railroad travel, when newer and larger hostelries began to be built. These were more like the hostelries of today, but were, of course, small and primitive compared with the caravansaries of the present decade. Whereas in colonial days a tavern of a dozen to thirty rooms was considered plenty large enough, the hotels that were built about the time the steam locomotive began to inaugurate a new era of transportation were three or four times that size, and there were even a few with as many as 200 to 300 guestrooms. The inn then became the hotel, its assembly-room became the lobby and the taproom began to be called the bar.

The South's Great Hotels of Early Days

The South lagged not one whit behind the North in this evolution of hoteldom. In fact, it set the pace. Southern cities vied with one another in having what were, for that day, large and sumptuous hotels to accommodate the augmented flow of travelers that the railroads brought within their bounds. And just as the South is entitled to the honor of having had the first steam railroad, so the South can also claim the honor of having had the largest and finest hostelry of that time. This was the old original St. Charles Hotel at New Orleans, the opening of which, in 1836, was heralded from one end of the country to the other. The old St. Charles, with its stately Corinthian portico, was generally conceded to be the most imposing piece of architecture in America, next to the National Capitol at Washington. There was no railroad reaching New Orleans at the time, but travel was growing heavier and the builders of the original St. Charles were evidently men of vision. They provided accommodations for 700 guests and were laughed at for having committed what was branded as a piece of folly. But when the first St. Charles burned to the ground in 1851 it was immediately rebuilt on a still more elaborate scale, having turned out to be a genuine business success. The St. Charles was again rebuilt in 1894 after it had again been destroyed by fire, and this is the building that now stands, though its interior has been completely remodeled and modernized in recent years, so that it still maintains its rank as one of the best hotels in America.

The South had other hotels in those early days of wood-burning locomotives that were the equal of any in the country. Boston and New York, transatlantic port towns, had begun to build hotels of more than colonial inn size prior to the coming of the railroad. Baltimore maintained the South's lead in those pre-railroad days with the 200-room Indian Queen Inn. This was the leading hotel of Baltimore until the opening of Barnum's Hotel, built at about the same time as the St. Charles in New Orleans. Its ballroom was the center of the social life of the city for many years. Charleston, whose citizens built the first hundred-mile railroad in America, the Charleston & Hamburg, erected the beautiful and commodious Charleston Hotel, which, by the way, had the unique distinction of being the only hotel in the country that burned to the ground on the day that it opened for busi-

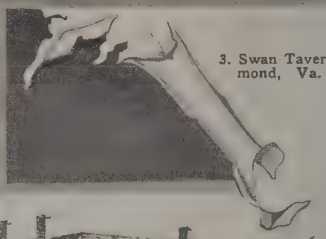
TYPICAL SOUTHERN HOTELS

TAMPA TERRACE HOTEL, TAMPA, FLA.

PARK INN, ASHEVILLE, N. C.

TRI-STATE HOTEL, MEMPHIS, TENN.

1. St. Charles Hotel, New Orleans, 1834



3. Swan Tavern, Richmond, Va. 1780

2

3

4

2. Raleigh Tavern, Raleigh, N. C. Typical Inn of South in Colonial days

4. Mt. Airy Hotel, Mt. Airy, Ga., one of South's earliest tourist hotels

CITIZENS HOTEL, LOUISVILLE, KY.

WASHINGTON HOTEL, SHREVEPORT, LA.

HOTEL CHARLOTTE, CHARLOTTE, N.C.

PAST
AND
PRESENT
FEDERAL HOTEL
CHARLESTON, W.VA.
BILTMORE HOTEL, ATLANTA, GA.
FRANCIS MARION HOTEL
GREENSBORO, N.C.
5. Eagle Hotel, Asheville, N. C., one of the first tourist hotels of this mountain resort
7. Old Stone Tavern, Frederick, Md., dating back to Revolutionary days
6. Ford's Hotel, Richmond, Va.—Civil War days
8. Old Planters Hotel, Charleston, S. C.
KENTUCKY HOTEL, LOUISVILLE, KY.
HOTEL ROOSEVELT, NEW ORLEANS, LA.

ness, in 1839. It was immediately rebuilt and reopened the following year. The original Planters' Hotel in St. Louis, opened in 1841, was another notable Southern hotel, acclaimed as "the largest hotel west of the mountains." Charles Dickens was its guest in 1842 and spoke highly of it in his "American Notes." The Planters, by the way, had the distinction of having the largest hotel ballroom in the country, 8911 square feet larger than that of the celebrated Tremont House in Boston.

These were but a few of the notable hostelries of the Southern states during the middle period of the Nineteenth Century. There were many more, and from that day to this the South has, in the matter of hotels, kept well abreast of the times. Cities of the South have always seemed to have a full appreciation of the fact that an outstandingly good hotel is the strongest magnet any city can have, but never has the South given more substantial evidence of this appreciation than it is giving today. As it did in the 40s and 50s when the railroad was coming into its own, the South is today adjusting itself to another new factor that has arisen to stimulate travel and create a demand for more and larger hotels. This new factor, the motorcar, has had somewhat of a revolutionizing effect on hoteldom, and its influence is, on the whole, fully as great as was that of the advent of the railroad. The automobile is not, of course, wholly responsible for the vast amount of new hotel construction, but it is perhaps the biggest factor. Going back to root causes, undoubtedly we must give Prohibition a considerable share of credit. It has helped to make it possible for automobile manufacturers to sell more than 4,000,000 cars a year.

In meeting this new demand of the traveler the South is building more hotels today than any other section of the country as a section. There are individual cities, of course, that make a better showing as such, because they are larger. Only one state, California, makes a better record as an individual state than its sister states in the South, but Florida is second on the list of states in volume of new hotel construction, and is so close behind California (which has the advantage of having such large cities as Los Angeles, San Francisco, etc.) that the two states may be said to be running almost neck and neck.

South Leading the Nation in Hotel Construction

Last year the South led the country in new hotel construction and it is leading again this year. Furthermore, it is leading by a very wide margin. The year 1923 was the biggest year of hotel construction in the country. It was thought that because of the high cost of labor and materials there would be somewhat of a drop in such activity this year. Instead, the banner record of last year has been far surpassed and a new high record established. To a large extent this has been due to the extraordinary zeal of the South in the matter of construction of new hotels. More than 614 new hotel projects are under way at the present time, or have been completed since the first of the year, in the sixteen states of the South and the Southwest. More than a hundred of these new hotels have been opened since the first of the year and are now doing good business. Many others are nearing completion and will be ready for opening either before the first of the year or within a few weeks or months thereafter. Other projects are just getting under way. Never a week goes by but several new contracts are let. Then there are the projects which have not as yet reached the contract stage. For these plans are being drawn by architects and the projects are being financed.

The financing of a hotel project nowadays is somewhat different from what it was years ago when hotels were much smaller and when building costs were much lower. At that time practically all hotels were built by individuals. The vast majority of the 614 new hotel projects in states of the South and Southwest this year are community projects. This is how it is being done all through the South, except in Florida. The building is erected by a company of local citizens. Experienced hotel men lease the building, equip it and operate it. This accounts largely for the growth of the chain-hotel idea. There are several large hotel chains in the Southern states and more in process of formation. One of these chains has added no less than six hotels, all in the million-dollar class, to its string this year. It is soldom that citizens of a community fail in their efforts to finance their proposed hotel. Sometimes they find it necessary to revise the plans and reduce the cost from one million dollars to half a million dollars, or whatever the figures may be, but the instances where plans for new hotels have to be abandoned entirely are rare indeed. Reference has been made to the fact that Florida is an exception to the community hotel rule. There the hotels are being built mostly by individuals and by small group of capitalists. Most of Florida's new hotels are of the tourist type and are, of course, a direct result of the tremendous growth of the winter-tourist business in that state. The communities themselves couldn't begin to keep pace with Florida's needs. People who go to Florida seem to like it so well there that they decide to locate there permanently, and since many of them are people of wealth, they all seem to decide to build hotels. In hotel circles the fear has often been expressed that Florida is overbuilding. Nevertheless the volume of new hotel construction in that state mounts higher and higher each year, and it is not unusual that a new hotel built one year is enlarged the following year or within the next few years.

The South's bumper crop of hotels this year, including hotel projects launched but which had not, up to October 1, reached the point where contracts have been awarded, will represent an outlay of more than $250,000,000. This is as much as the entire cost of all hotels that were opened for business in all parts of the United States in 1923. Definite figures compiled on 397 of the 614 Southern hotel projects show an aggregate cost of $196,662,500 for construction and equipment. Allowing generously for those projects which will perhaps fall by the wayside, the rest of the 614 projects will in all probability bring the grand total for the year easily over the $250,000,000 mark.

How does this compare with the rest of the country? That it compares very well indeed may be seen by the fact that throughout the United States the total number of new hotel projects for the year, up to October 1, was 1665. Thus more than a third of the new projects for the year are in Southern and Southwestern states—37 per cent, to be exact. Not a bad showing when mass of population and size and number of large cities are considered. Not a bad showing any way you look at it, for that matter.

As in the rest of the country, the majority of new hotels in the South are small hotels, fifty to a hundred rooms, many of them thirty to fifty rooms. This means that the little cities as well as larger centers of population are getting new hotels. Despite lack of size, these smaller hotels are thoroughly up to date. They have "all modern conveniences," every room with a bath in many instances. The old bowl and pitcher days have gone forever. The wayside inn of olden times, when the stage coach was the fastest means of travel, has come back, and is coming back stronger every year. But the wayside inn of today is quite different from the wayside inn of yester-

day—much more pretentious, much more luxurious and much larger.

Various reasons are ascribed for the fact that the South is leading the rest of the country today in volume of construction of new hotels. First of all, this new hotel activity is a gratifying indication of the prosperity and commercial briskness of the South. It means that the South is growing and developing rapidly in wealth and population and has taken on new industrial life. Another reason is that the South is rapidly coming into its own as a playground center of the country. This is particularly true of the "American Riviera," as Florida has sometimes been called, and of other states along the Atlantic seaboard. These states, by the way, outrank the other Southern states in new hotel construction.

Capitalizing Its Climate Increasing Hotel Activity

The South began rather late to capitalize its climate, although there have been nationally known resort hotels in that section for fifty years. Florida had resort hotels forty years ago, but it was not until Henry M. Flagler built the East Coast chain that the "Sunshine State" began to attract attention nationally. A little before the World War Florida began to strike her stride. Since the close of the war her development as a resort center has been nothing less than phenomenal, and it is safe to say that today it is the greatest resort state in the Union. But other sections of the South are bidding, with success, for the tourist business. Along the western Gulf Coast several fine hotels have been opened within the past couple of years. Georgia, the Carolinas, Virginia, Tennessee, Alabama and other states are waking up to the fact that the tourist business is growing by leaps and bounds, and that to get their share of it these states must have two things—plenty of good roads and plenty of good hotels. Mountains, lakes, seacoast and climate will do the rest, not to mention good golf links.

Of course, Florida does not, and never has, monopolized the tourist business in the South. There are many notable resort hotels in other sections, and there are a number of cities that have become nationally famous as resort centers. One of these is Asheville, N. C., a city of about 30,000 population, in which two million-dollar hotels have been opened this year, the George Vanderbilt and the Battery Park, together with a smaller hotel of 45 rooms, the Princess Anne, costing $150,000. Still further additions to Asheville's list of hotels are in prospect. Several months ago a corporation headed by Major John Bechtel of Boston bought a 550-acre tract for resort development, including a $750,000 hotel of 200 rooms. Asheville's most famous hotel, and acclaimed by many to be the most interesting resort hotel in the world, is the widely known Grove Park Inn, managed by F. L. Seely. The Grove Park Inn was built a few years ago by Mr. Seely for E. W. Grove, who is also owner of the new Battery Park Hotel, which succeeds the old Battery Park, built in the 70s. Architecturally, as well as in other respects, the Grove Park Inn is unique among hotels. Built of the great boulders of Sunset Mountain, on which it stands, it is perhaps the most fireproof and solidily built structure in America. Its massive rustic walls are four and a half feet thick, of boulders backed with solid granite and Portland cement. Roofs, floors and walls are of similar unshakable solidity. It is the nearest approach to a soundproof hostelry in this or any other country. Conducted as a hotel of the highest type, the Grove Park Inn, which does a big business in all seasons, is a notable illustration of the possibilities along this line in other favored districts in the South.

14,000,000 Automobiles Creating a Vast Tourist Travel

A third reason why the South is building so many new hotels is that automobile touring is possible all the year round in that section. Southerners can go on long trips at any season and still not perish of cold. Northerners can go South, or to California, to escape bitter weather. More and more of them seem to be preferring to go South. It is nearer and its roads are getting better, and the South has as much, if not more, to offer in the way of scenic and historic interest. Mostly these Northerners go in motorcars, and if they are headed for Florida, as many are, they have to pass through several states and to stop at many hotels along the way. The motorist takes the route that has the best roads and the best hotels. He expects virtually the same accommodations in the smaller cities as he gets in New York, Chicago or any of the larger cities. And generally in these days of road maps and guide books he knows what to expect as he goes along, and arranges his itinerary accordingly. There are 14,000,000 owners of motor cars in America, and cars are being manufactured at the rate of about 4,000,000 a year. Each of these automobiles is a potential asset to any hotel within a hundred miles of its home garage. A growing number of them each year are potential assets to hotels a thousand miles or more from home. America is infected with the motor germ, and owners of cars like to hit the trail for distances long and short. This cross-country motor business will reach its peak only when there is no more road building to be done. And until then new hotels will continue to spring up like magic, though perhaps not with the phenomenal frequency of the present year.

Cross-country travel by motor is said to have increased 100,000 per cent in the last decade. It fairly staggers the mind to consider the magnitude of this form of travel if this increase keeps on for another ten or twenty years, as it seems likely to do. And it is this that is making many a good hotel town, from the hotel man's standpoint, out of what has heretofore been a poor hotel town. If the hotel is in a town on a good motor trail, it is its own fault if it does not do good business. And especially in the South, where motor touring is possible from one end of the year to the other.

If there ever was a time when the traveler had just cause for complaint against the paucity of good hotel accommodations in the South, decidedly that time has gone by. There are always kickers, of course, and scoffers, mostly of the parvenu and fourflusher order, who like to show off and try to create impressions. Hotels and trains are their chief prey. And now, in these motoring days, roads. The hotel, railroad or highway that is farthest from them at the moment is always the best. But the traveler who hasn't been South in five years would today find more than 1600 new hotels in that region, in cities large and small, with standardized accommodations and service that put the small town on a par with the big town. He would find in the cities palatial new hotels which, from the standpoints of architecture and general efficiency, rank with the very best structures of the kind in the country. He would also find that most of the older hotels have been thoroughly overhauled and modernized, with hundreds of new baths, new plumbing, new lighting, new heating plants, new furnishings and equipment, larger lobbies, larger dining-rooms, and other improvements. They have had to do it to meet the competition of the newer hostelries.

Some idea of the sort of hotels they are building in the South these days may be gained from the fact that this

year's crop of new hotels includes 81 million-dollar projects (that is, hotels costing $1,000,000 or more) in the sixteen states of the South and the Southwest, as against 133 for the rest of the country. Again the South maintains, very nearly, its ratio of 37 per cent. These million-dollar projects are scattered about as follows: Florida, 21; Texas, 9; Virginia, 7; Georgia, 5; Alabama, 6; Louisiana, Kentucky, West Virginia, Arkansas and Maryland, 2 each; Missouri, 5; Tennessee, 7; North Carolina, 7; South Carolina, 3; Oklahoma, 1, and Mississippi none, although the million-dollar Hotel Edwards was formally opened at Jackson, Miss., last New Year's Day.

The South's largest hotel of the 1924 crop is the new Hotel Biltmore, opened last April 19 at Atlanta, Ga. The Biltmore is a $7,000,000 structure, and is one of four or five 1000-room hotels opened, or to be opened, this year in the United States. The Biltmore is one of three-million-dollar hotels opened in Atlanta this year. The others are the Robert Fulton Hotel of 300 rooms, opened September 6, and the Henry Grady Hotel of 250 rooms, now nearing completion. The Shelton Hotel, a bachelor hotel, was opened in Atlanta on April 1, making four large new hotels for that city this year.

A hotel does not, of course, necessarily have to cost a million dollars or more to be a fine hotel. The hotels that cost that much have, generally, 200 or more rooms. It is simply a matter of size, though, of course, building costs and construction types vary in different states and places. More rooms can be built for the money in Florida, it would seem, than in New York, for instance. One reason for this is that the climate does not necessitate the weatherproof sort of construction that is needed in the North. Another factor is heighth. However, even in Florida, where there is still plenty of elbow room, they are now building hotels of the skyscraper type. Mostly, however, the new hotels in Florida are three and four-story structures, Spanish style of architecture predominating.

The following is a summary of new hotel construction in Southern and Southwestern states, including new hotels opened, hotels in course of construction and hotels projected, for the first nine months of this year:

Leading Hotels Under Construction in South in 1924

Alabama—There are at least 29 new hotel projects under way and the estimated cost of 17 of these projects is $6,582,000. Birmingham, metropolis of the state, is the greatest center of new hotel activity. Nine new projects have been announced there this year. One of the largest of these is the new Redmont Hotel, being built by the Dinkler Brothers, owners and operators of the Tutweiler, Birmingham, and the Ansley and Piedmont Hotels, Atlanta. The Redmont will have 250 rooms and cost $1,500,000. The Hotel Altamont, residential and transient, with 375 rooms, opened last June 16.

Arkansas—Twenty-two new hotels are under way, the estimated cost of 12 of them totaling $5,370,000. The new 500-room Hotel Arlington, costing $3,500,000, replacing the old Arlington at Hot Springs, which burned two years ago, is scheduled to open December 31 next. The second largest Arkansas project is the Arkansas Hotel, 200 rooms, being built at Little Rock by S. J. Newcomb, proprietor of the Hotel Albion, Augusta, Ga., and his brother, S. J. Newcomb of the Bristol Hotel at Bristol, Va. Citizens of Texarkana have subscribed $600,000 for a 200-room hotel, to be ready shortly after the first of the year.

Florida—Definite figures on 118 hotel projects show that they will cost approximately $43,804,000. A total of 168 projects have been announced since the first of the year. It is estimated these will cost in the neighborhood of $70,000,000. Many of these hotels are already completed and doing business, while many others will be opened about the first of the year. Miami is the most active hotel construction center in Florida, with no less than 53 projects under way. St. Petersburg ranks second with 14 projects. The 168 projects are distributed in 69 different towns of the states, showing that Miami's success as a winter-tourist center has inspired many communities to enter into competition with the "Magic City." The total number of hotel rooms for 135 of the 168 projects is 16,764.

Georgia—Twenty-eight projects under way, 20 of them aggregating $17,655,000. An even score of Georgia cities are to have new hotels this year or early in the coming year. One of Georgia's biggest projects is a 500-room hotel, to cost $2,000,000, at Stone Mountain. G. Lloyd Preacher, Atlanta architect, is drawing plans for the Sherwood Forest Estates, Inc., organized to develop a resort within view of the great Confederate monument, carved out of the solid rock of the mountain side by Gutzon Borglum. In the smaller cities the 110-room Thronateeska Hotel is being built at Albany at a cost of $350,000.

Kentucky—Fifteen of 21 new hotel projects are estimated to cost $8,285,000. These projects are in seventeen cities. Louisville, where the 700-room Hotel Brown opened last year, is to have another huge hotel, the Kentucky, with 425 rooms, now nearing completion. Still another project in Louisville calls for an expenditure of $1,600,000 for a 150-room hotel at 4th and Kentucky streets. Bowling Green has a new $500,000 hotel, the Helm, opened in August, and work is progressing on a half-million-dollar hotel at Owensboro.

Louisiana—This state has 15 new hotel projects under way. Ten of them are to cost $6,480,000. The largest project is the 17-story addition to the Hotel Roosevelt (formerly Grunewald) at New Orleans. This will contain 600 rooms. The contracts were let in August, and Arthur Bengalia, general manager, announces the addition will be ready next fall. The $1,500,000 Hotel Washington at Shreveport, built by E. Kirby Smith and associates, was scheduled to open October 1.

Maryland—Thirteen projects under way, six of them to cost $6,535,000. Baltimore's share of this activity includes a 400-room "stag" hotel to cost $800,000, work on which began in August. Harry Busick, president of the Caswell Hotel, is promoting erection of a 1000-room hotel at Baltimore to cost about $5,000,000, work on which is expected to start next spring. A 17-story addition to the Emerson Hotel, Baltimore, costing $500,000, was scheduled for completion in October. Two large apartment hotels are also being built in Baltimore. The Wicomico Hotel of 150 rooms, opened in September at Salisbury, is one of the finer hotels in the smaller cities of Maryland. A 300-room hotel, with underground garage, is under way at Cumberland.

Mississippi—Seventeen hotels are under way in Mississippi. Ten of them are to cost $1,250,000. Plans are under way for a $500,000 hotel at Pass Christian. One of the finest Gulf Coast resort hotels, the Buena Vista at Biloxi, was opened by Col. J. W. Apperson, July 3. It has 100 rooms and cost $500,000.

Missouri — Forty-five projects have been launched within the year and twenty-six of them call for an expenditure of $12,935,000. Twenty-one of these are in Kansas City and four in St. Louis. In the latter city a 400-room addition to the Jefferson Hotel is being built and the 400-room Mayfair Hotel is under way. The Kansas City list includes a number of apartment hotels. The residential hotel idea seems to be catching on big there.

North Carolina—Next to Florida, North Carolina is the busiest state along the Atlantic seaboard. Forty-five projects are under way, thirty-three of them costing $13,538,000. The activity at Asheville has already been mentioned. The $1,500,000 Charlotte Hotel was opened at Charlotte March 10. Durham, Wilmington and Greensboro are among the cities where million-dollar projects are under way.

Oklahoma—Oklahoma's new hotels this year will be 32 in number, with 24 of them costing $7,240,000. The biggest project is the 20-story Hotel Mayo at Tulsa, which will probably be ready for opening around the first of the year. The Tulsa Hotel also is having a 220-room addition, costing $600,000, and the Wells Hotel, with 150 rooms and costing $450,000, was opened January 24. Several smaller projects are under way in the oil capital. Most of the Oklahoma projects are in oil-boom towns.

South Carolina—Seventeen projects have been launched this year. Eleven of them will cost approximately $5,700,000. Two of the largest and costliest of these projects have been opened in Charleston, the first being the Fort Sumter Hotel, a $1,000,000 structure, opened last March; the other, the Francis Marion Hotel, named in honor of Gen. Francis Marion, the "Swamp Fox" of Revolutionary fame. This has 325 rooms and cost $1,700,000. The John C. Calhoun Hotel at Anderson and the Poinsett Hotel, Greenville, are other notable new hotels under way.

Tennessee—Thirty projects are under way, nineteen of them aggregating $16,659,000. Among half a dozen projects in Memphis, the new Hotel Peabody, costing $5,000,000 to build and equip, is the largest. The 400-room Hotel Claridge was opened at Memphis on June 2 and the 200-room Adler Hotel was scheduled to open November 1. The Polk Hotel, residential, opened in midsummer. The Andrew Jackson Hotel at Nashville, a $1,500,000 structure, is one of the largest hotels under way outside of Memphis.

Texas—Oil, tourists and general prosperity have caused 87 new hotel projects to be launched in Texas this year. Fifty-two of these involves an expenditure of $27,394,000.

Virginia.—Twenty-four projects in the Old Dominion include such notable hotels at the William Byrd Hotel at Richmond, a $1,000,000 addition to Murphy's Hotel, Richmond, and the Yorktown Manor Hotel at Yorktown, for which ground was broken last March. This is a 300-room project costing $2,000,000. A 315-room hotel also has been planned for the site of the old Chamberlain Hotel at Old Point Comfort. Congress recently granted permission for use of the site for a long term of years. A group of railroad men, mainly Philadelphians, are back of this $2,000,000 project. Fourteen of the 24 Virginia projects will cost approximately $11,010,000.

West Virginia—Ten of West Virginia's 21 hotel projects are estimated to cost $6,225,000. The largest project in the state is the Prichard Hotel at Huntington, being built at a cost of $2,500,000. This will have 600 rooms and be one of the largest hostelries in that section of the country.

Southern Building and Construction

Contracts awarded for building and other construction projects in the South in 1923, costing $10,000 each and over, had a total valuation of more than $558,000,000. If to this sum should be added the amount for thousands of dwellings and other improvements costing less than $10,000 each the total would probably exceed $750,000,000. During the year 1923 preliminary announcements on contemplated construction projects involved the expenditure of nearly $1,500,000,000.

From the standpoint of money involved, contracts awarded for roads, paving and bridge work hold first place, the total for this work for 1923 being $174,650,000, as compared with $157,120,000, the total for the preceding year. Next comes miscellaneous enterprise contracts awarded, with a valuation totaling $96,260,000, comprising such projects as garages, railroad shops, grain elevators, water and rail terminal facilities, piers, hydro-electric plants and all such work not specifically covered in the other classifications. Hotels and apartment-houses total $94,190,000 for 1923. In addition, residential awards had a valuation of $21,650,000 in 1923 compared with $17,578,000 in 1922.

The construction statistics presented are a compilation of the reports printed in the Construction Department of the Manufacturers Record, which give a weekly summary of building and construction operations throughout the South. They include only those items for which actual figures were available as to approximate cost, no attempt being made to estimate the contract price of the scores of miscellaneous structures and enterprises on which no cost figures are furnished and not including requests for bids when no figures are available.

Summary by Classification of Southern Construction

Classification	1922 Contracts awarded	1922 Contracts to be awarded	1923 Contracts awarded	1923 Contracts to be awarded
Apartment-houses and hotels	$54,088,959	$106,834,250	$94,194,837	$152,570,335
Association and fraternal	11,174,100	30,288,418	12,286,833	37,039,500
Bank and office buildings	42,369,443	47,987,780	41,219,311	69,564,397
Church buildings	15,744,340	44,895,700	13,745,617	49,168,682
City and county projects	9,269,278	47,146,490	11,344,391	25,348,104
Dwellings, minimum cost $10,000 each	17,578,927	51,718,770	21,645,232	51,962,679
Miscellaneous enterprises	145,303,701	385,791,438	96,268,877	673,855,046
Roads, paving, and bridges	157,119,589	192,338,574	174,647,797	194,072,530
School buildings	60,575,015	123,697,528	56,085,320	126,431,252
Sewers, drainage and water-works	26,635,272	96,607,350	21,163,039	78,678,244
Store buildings	15,419,710	25,420,900	15,560,201	38,602,199
Total	$555,278,334	$1,152,727,198	$558,161,455	$1,497,292,968

Progress of the United States—1874-1924

By O. P. Austin, Statistician, The National City Bank of New York

Fifty years is a short period in the life of a nation. From my desk I see just across Wall street a heroic statue of Washington, marking the birthplace of the nation, the spot at which the new Union under the Constitution was established in 1789, only 134 years ago. At that time the young nation had a population of 4,000,000, of which about 97 per cent was in the Atlantic frontage stretching from Maine to the Florida line, and the remaining 3 per cent in the Mississippi Valley.

O. P. Austin

In 1874, the beginning of the half century which the editor of the Manufacturers Record now celebrates, the population of the entire country was approximately 40,000,000, or ten times as much as in 1789. Of this 40,000,000 in 1874 about 45 per cent was in the Atlantic frontage and the remainder in the Mississippi Valley, which the alert population of the country at that time had come to recognize as possessed of great agricultural possibilities, though they then scarcely realized its great supplies of manufacturing material which have contributed so much to its recent success.

The Mississippi Valley had 3 per cent of the population in 1789, 20 per cent in 1870 and 50 per cent in 1920, the latest census record of population. In fact, the total population of the Mississippi Valley grew from a quarter of a million in 1789 to 20,000,000 in 1870 and 53,000,000 in 1920. The "Great American Desert," shown on the maps of the United States a half century ago, has disappeared and the area which it occupied is now the home of millions of prosperous people. It is largely with the growth of this great central area, its industries and business, that we must deal in the story of the wonderful development of the country in the half century which the editor of the Manufacturers Record now celebrates.

The official reports of the Government showing population, business, finance, industries, etc., divide this Mississippi Valley into four distinct sections, which they designate as "East South Central" and "West South Central," and "East North Central" and "West North Central." The entire "South Central" area includes Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma and Texas. The "North Central" area includes Ohio, Indiana, Michigan, Minnesota, Wisconsin, Iowa, Nebraska, Kansas, Missouri and the Dakotas. The great development of the "South Central" area is due to enlarged production of cotton, livestock, forest products, minerals, petroleum and a great increase in manufacturing. The big growth in the "North Central" section occurs in the production of wheat, corn, iron ore, timber products, petroleum and the manufacturing industries. In 1874 one railway line connected the Atlantic and Pacific Coasts; now the number of "transcontinental" systems may be counted on the fingers of both hands.

But before we enter upon the wonderful story of the industrial development of the country in this 1874-1924 period, let us take a bird's-eye view of the growth of its business activities meantime. Probably there is no more accurate instrument for the measurement of industrial and business activities than that supplied by the records of the great banks of the country. From the records of the National City Bank of New York, now 112 years old and with present resources of over a billion dollars, I find that its deposits grew from $7,000,000 in 1874 to $841,612,000 in 1924; its loans and discounts from $6,000,000 in 1874 to $537,026,000 in 1924, and its total resources from $9,391,000 in 1874 to $1,027,054,890 on June 30, 1924. Meantime the total number of banks in the country grew from 6503 in 1874 to 30,380 in 1922, and their total deposits from $2,045,834,000 in 1874 to $40,528,714,000 in 1922. The ability of the people to make deposits in banks measures the growth of their prosperity, and these tremendous increases in banking activity during a period in which population was increasing but 150 per cent illustrate the growth in individual prosperity among the people as well as that of the country as a whole.

Still another evidence of the growth of prosperity in the 50 years ending with 1924 is the fact that the census record of wealth in the United States advanced from $30,000,000,000 in 1870 to $321,000,000,000 in 1922, an increase of 970 per cent in the wealth of the country, while the population was increasing but 163 per cent. The average per capita wealth of the population of the country has increased, according to census reports, from $780 per capita in 1870 to $2938 in 1922, the average per capita wealth in 1924 being nearly 4 times as great as in 1870.

The causes of this important development in the United States in the past half century as compared with that of other parts of the world are not far to seek. The Statesman's Year-Book, then as now a standard authority, in its 1871 edition said of the United States: "Only one-fourth of the country is inhabited to any great extent by civilized people," adding that "of the 1,921,000,000 acres of land in the entire country (exclusive of Alaska) over 1,400,000,000 acres are for sale by the Government land officers." With this official evidence of the area available for homes in a temperate zone country in which relations between the peoples of the climatic areas were again in perfect and permanent accord, it is not surprising that millions of energetic and industrious people of other countries sought our shores and unoccupied lands in their search for homes, in numbers ranging from a few hundred thousand to upward of a million a year. The official records show that the number of immigrants entering the United States in the half century, 1874-1924, aggregates over 25,000,000. They distributed themselves over the entire country, many of them aiding in the development of the fertile lands of the great Mississippi Valley, and the number of citizens of foreign birth in the United States in 1920, the latest official record, was 13,500,000, of whom more than 5,000,000 were in the area popularly known as the Mississippi Valley.

Meantime millions of others rejoicing in the title of "American-born citizens" poured over the mountains, and the census of 1920 showed the number of people in the "Middle West," including in this term the areas officially designated as East and West South Central and East and West North Central, was 53,155,000, against 14,416,000 in 1870; the population of this central area increased 174 per cent in the fifty-year period, while that of the Atlantic Coast increased 140 per cent, and that of the Pacific and mountain section increased 800 per cent.

While this growth in population, industries, bank activities, railroads and wealth has occurred in all the great sections of the country, it is at least interesting to note in detail the relative gains in the three great sections, the Atlantic Coast, the "South Central," or lower Mississippi Valley, and the "North Central," or upper Mississippi Valley; for it is, as already suggested, in the Mississippi Valley that the chief growth has occurred.

The wonderful growth in the Mississippi Valley has occurred especially in the southern section, designated by the governmental publications as the "South Central." It will be noted from the table which follows, showing the growth in business and industries in each of the great geographic divisions of the country, that the division designated as "South Central" shows a larger percentage of gain in most of the great factors of prosperity than is shown by any other of the great geographic divisions or of the country as a whole. Thus the South Central division shows an increase of 197 per cent in population in the 1870-1920 period, while that of the country as a whole increased but 174 per cent and the Atlantic frontage 140 per cent. In farm acreage the percentage of increase in the South Central section is also larger than the country as a whole and this is true also in the value of farm property. In livestock values the percentage of increase in the South Central division exceeds that of any other of the geographic divisions. In miles of railway the percentage of increase of the South Central section exceeds that of any other division, while it will also be noted that the percentage of increase in wealth in the South Central division in the period 1870-1920 exceeds that of any other division or of the country as a whole:

GROWTH IN POPULATION, AGRICULTURE, MANUFACTURING, RAILWAYS, BANKING ACTIVITIES AND WEALTH OF THE UNITED STATES, FROM 1874 TO 1924, BY THE GREAT GEOGRAPHIC DIVISIONS—ATLANTIC FRONTAGE, SOUTH CENTRAL AND NORTH CENTRAL SECTIONS—AND THE TOTAL FOR THE UNITED STATES

		1874*	1924*	Per-cent of increase
Population:	Entire United States	38,558,000	105,711,000	174
	†Atlantic frontage	18,152,000	43,652,000	140
	‡South Central	6,434,000	19,136,000	197
	¶North Central	12,981,000	34,020,000	162
Farms (acres):	Entire United States	407,735,000	955,884,000	134
	Atlantic frontage	152,957,000	155,339,000	2
	South Central	99,343,000	252,346,000	154
	North Central	139,214,000	374,708,000	169
Farm Products (value):	Entire United States	$1,958,031,000	$21,425,624,000	994
	Atlantic frontage	753,815,000	4,695,901,000	522
	South Central	365,204,000	4,535,026,000	1,141
	North Central	783,334,000	9,991,538,000	1,175
Farm Livestock (value):	Entire United States	$1,229,890,000	$8,013,325,000	551
	Atlantic frontage	440,936,000	1,398,721,000	217
	South Central	198,863,000	1,599,487,000	704
	North Central	533,480,000	3,880,645,000	627
Farm property (value):	Entire United States	$8,944,858,000	$77,924,100,000	771
	Atlantic frontage	3,688,291,000	11,255,622,000	205
	South Central	906,977,000	12,041,532,000	1,227
	North Central	4,108,659,000	45,236,979,000	1,001
Manufactures (value):	Entire United States	$4,232,325,000	**$43,653,282,000	931
	Atlantic frontage	2,905,349,000	**22,476,475,000	673
	South Central	150,492,000	**2,818,000,000	1,772
	North Central	1,073,112,000	**15,312,000,000	1,326
Railways (miles):	Entire United States	52,922	251,175	374
	Atlantic frontage	21,552	62,280	188
	South Central	6,073	50,502	732
	North Central	22,747	96,380	323
Banking Capital:	Entire United States	$719,424,000	$3,052,217,000	324
	Atlantic frontage	486,444,000	1,332,103,000	173
	South Central	44,655,000	334,759,000	649
	North Central	155,128,000	1,039,242,000	569
Wealth:	Entire United States	$30,068,518,000	$320,803,862,000	966
	Atlantic frontage	14,031,326,000	131,245,971,000	835
	South Central	1,721,747,000	32,851,264,000	1,808
	North Central	7,633,642,000	114,841,896,000	1,404

* Figures are in many instances necessarily those of the preceding decennial year 1870 or 1920.
† Includes all states fronting on Atlantic, also West Virginia.
‡ Includes Kentucky, Tennessee, Alabama, Louisiana, Mississippi, Arkansas, Oklahoma and Ohio.
¶ Includes Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, Kansas, Nebraska, Minnesota, North Dakota and South Dakota.
** Census 1921.

Southern Life Insurance Companies' Growth

Carrying More Insurance Than All United States Companies in 1892

By Robert F. Moore, Atlanta, Ga.

To know that "America leads" always brings joy to everyone who has the true interests of the country at heart, be he citizen born, naturalized or alien, and in no line of industry or sport do these words apply more strongly than to the business of life insurance.

For years past the United States led the world in the volume of protection carried by those living under the aegis of its flag. Thrift-protection for those who are dependents was a watchword that has been preached the length and breadth of the land, and notwithstanding the fact that the establishment of life insurance in this country is of comparative recent growth, its value has been far more readily appreciated by the active, up-to-date, go-ahead American people than by those of any other nationality in the world.

Robert F. Moore

Notwithstanding this, it is astonishing how little we as a people have made a study of the business of life insurance or realize the dimensions to which it has attained.

Accustomed, as we are, to talking and thinking in big figures, how many are there who have any conception of the amount of life insurance which is carried in this country, of the amount of new business that is added yearly, or of the money which year by year the people of the country invest in this mode of protection?

To be told that the amount of legal reserve life insurance alone, and it is only that form of life insurance that is considered in this article, amounted in December, 1923, to $54,800,529,513, almost fifty-five billion dollars, would appear to the average man almost incredible, as would the fact that the amount invested by the people of America to secure this amount of protection was, last year, $1,901,725,491. The figures are taken from the Insurance Field of July 18.

Going back to early days, the origin of insurance is commonly assigned to the Eighteenth Century, but it undoubtedly was practiced many years before, as in a French work called "Guidon," which was evidently written in the Sixteenth Century, reference is made to "insurance made by some nations upon the life of men, in case of their decease upon a voyage, to pay certain sums to their heirs or creditors." We have no record of how much earlier than this "some nations" practiced life insurance.

Endowments for children, put forward by some companies in recent years as something new, were known, according to an English publication printed in 1584, and to a certain degree practiced even then.

The first official record of the formation of a company for the assurance of lives for the benefit of the widows of clergymen and others was that of a company originated by the Rev. William Assheton, D. D., of Middletown, Lancashire, England, under the name of "The Mercers' Company," which began business in London in 1698. This was followed in 1700 by another society in England called the "Society of Insurance for Widows and Orphans."

The first Life Insurance Society that was founded in this country was in 1759, and was known as the "Presbyterian Ministers' Fund" for insuring the lives of Presbyterian ministers only; but it was not until 1843 that the first life insurance company to write general life insurance in existence today was chartered, which company in its first year wrote 476 policies.

In a work published in New York in 1870, the name of the author of which is not given, just twenty-seven years after the organization of the first company, we are informed that "In the United States there are about one hundred life companies, receiving an annual income of nearly $50,000,000. But little short of four hundred thousand lives are now assured, covering risks amounting to about $1,000,000,000. These are striking proofs of the popularity of life insurance. During each year more than *six millions* of dollars are paid by the life companies in the United States to the families and representatives of the assured, mainly to widows and orphans. The number of policies now issued yearly is not far from 120,000, and the business is constantly and rapidly increasing."

What would this writer have thought if he could have had a vision of the present day when the number of legal reserve companies is more than treble the number quoted, and when the new business written last year amounted to $12,483,034,805, and one company alone issued or revived no less than 239,514 policies, or practically double what were issued by all companies in 1870?

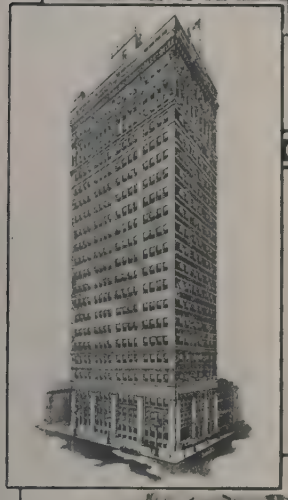
Of the early days of Southern life insurance companies the records are very meager, but of the 97 Southern legal reserve companies operating today only one company was operating as such prior to the Civil War. Of the remainder, all with the exception of six have either been organized or reincorporated since the beginning of 1900, at which time the total amount of life insurance carried in the South by legal reserve companies was just over one billion dollars, of which amount practically only 3 per cent was carried in companies organized in the South. In that year less than a quarter of a million new insurance was written by all companies in the South, and Southern companies were responsible for only 3½ per cent of what was written. The sum paid by Southern people that year for their protection was thirty and a quarter millions, of which only 4 per cent went into the coffers of Southern companies.

As showing what the establishment of the new life insurance companies has meant to the South, the figures taken from the statements of companies for 1923 are particularly interesting.

Of the amount of $54,800,529,513 in force throughout the country on December 31 last, $12,192,509,280 was carried on the lives of the people of the South, and of this sum $4,230,577,539 was carried by companies organized in the South, or 34.73 per cent, compared with 3 per cent at the beginning of 1900. The amount of new insurance written in 1923 throughout the country was $12,-

THE VOLUNTEER STATE LIFE INSURANCE CO.
CHATTANOOGA, TENN.

MISSOURI STATE LIFE INSURANCE CO.
ST. LOUIS, MO.



NATIONAL LIFE AND ACCIDENT INSURANCE CO.
NASHVILLE, TENN.

AMICABLE LIFE INS. CO.
WACO, TEXAS.

LAMAR LIFE INS. CO.
JACKSON, MISS.

PROVIDENT LIFE AND ACCIDENT INSURANCE CO.
CHATTANOOGA, TENN.

ATLANTIC LIFE INSURANCE CO.
RICHMOND, VA.

483,034,805. Of this $3,114,748,911 was on the people of the South and $1,375,082,984 was written in Southern companies, giving a percentage of 44.11 per cent, as against 3½ per cent in 1899 and 31.14 per cent in 1921.

The amount invested by the people of the country last year in the purchase of life insurance was $1,901,725,494, including $393,900,504 by the people of the South, out of which, $130,935,476 was received by Southern companies, or 33.24 per cent, as against 4 per cent in 1899 and 23.23 per cent in 1921, for reinvestment in the South's own confines.

In going over the figures in past years of insurance in force, insurance issued during the year and the premium income received for insurance it is interesting to note that the amount of insurance of Southern companies on December 31, 1923, was more than was carried in the whole country in 1892, the figures being as follows:

In force throughout the whole United States
December 31, 1892.....$4,208,975,473
In force in Southern companies
December 31, 1923..... 4,230,577,539

In insurance issued last year the figures are slightly more than was written throughout the entire country in 1900, as follows:

New Insurance written throughout the United States in 1900.....$1,356,769,653
New Insurance written in the Southern companies in 1923..... 1,375,082,984

The money paid in premiums to Southern companies in 1923 we find is only slightly less than was paid in premiums throughout the entire country in 1889, as the following figures will show:

Premium income of all companies in United States in 1889.....$134,683,894
Premium income of Southern companies in 1923..... 130,935,475

The foregoing figures give some idea of what has been done in the South in the way of its further economic advancement during the last 24 years.

Life insurance within the last half-century has advanced in a way that no one could possibly have foreseen, and apparently will continue to increase, as all signs point that way. When you consider the strides the Southern companies have made in the last quarter of a century, does it not seem almost phenomenal and does not the prospect foreshadow an even greater increase in the volume of business which will be done by Southern companies from year to year? All that is required is the continued co-operation and support of all its people and their full appreciation of what such growth means and the possibilities of the advantages that can accrue to them along the lines of their own mutual and individual interests.

Much has been written and said in the last six years of what some of the European nations have done toward reconstruction since the great war, but has there ever been a more brilliant example than has been shown in our very midst? Looking back through the vista of years and considering the conditions of the Southern people before the Civil War, it is with wonder that we view the stupendous results accomplished. Thrown entirely upon their own resources, deprived of their wealth and having suffered the loss of so many of those on whom they naturally would have relied, the people of the South, with untiring energy and indomitable courage, set to work to re-establish themselves, with the result that today they stand forth in their strength, having taken once more that high position which is justly their due in the business industries of the country, and more particularly in the great business of life insurance. The future is undoubtedly bright. The Southerner is, year by year, becoming more and more to realize the value to himself and his community of the growth of his home companies, and is emphasizing that realization by the way in which he is patronizing and co-operating with them.

New Home of the Jefferson Standard Life Insurance Co., Greensboro, N. C.

The Southern companies, too, are broadening out and carrying their business into the home territories of their Eastern and Western competitors, and it should not be very long hence before the number of Southern companies operating in every state in the Union outside of the South should be on a par with the number of companies from those states which are operating in the South. When this becomes a reality, then indeed may the South say of its insurance companies, "They have come into their own."

Cotton Mill Employes of the South

The Best Cotton Mill Labor in the World Working Under the Best Conditions in the World

By Wade H. Harris, Charlotte, N. C.

EMPLOYES OF AN ALABAMA COTTON MILL—ALL 100 PER CENT AMERICANS—TYPICAL OF FEMALE MILL OPERATIVES IN THE SOUTH

In the Fall of 1900, twenty-four years ago, the late D. A. Tompkins and the writer were journeying through Mitchell county in a surrey. In the course of the travels the subject of the condition of the people in that isolated section was much under discussion, emphasized by the many evidences of courage under adverse circumstances which developed along the way. There were no good roads in those days and the consolidated school was an unknown institution. The children of the mountaineers were forced to walk miles to the old field school, where the rudiments of an education were taught during short terms, and education of the children was the sorest problem that faced the average family. There was no aspiration to the luxuries of life, for that was a hopeless prospect. The family labored year in and year out, to find itself at the end of the year no better off than at the beginning. If it succeeded in developing a full measure of the necessities, it was doing well and was satisfied. By the roadside was a farmhouse, roughly finished, but comfortable withal. Around it was a small garden and on the hillsides a cultivated patch from which the family was expected to "make a living." The porch was trellised with vines and the front yard was bright with flowers. The interior was tidy and clean. Down at the spring the mother was busy around the wash tub; two boys were helping their father at the barn; a younger daughter was "minding the baby," another daughter was cooking the dinner, and the oldest girl in the family was "cleaning up the house." The only books to be seen was a collection of the elementary kind used in the country school. This mountain farmer, with the help of his boys, raised a sufficient crop of corn, potatoes, tobacco, cabbage, buckwheat and vegetables for the use of his family; the surplus was converted into cash at the county town, and the money so derived was all that came into the hands of the family from one year's end to the other.

Wade H. Harris

Nobody can call "Hello!" at a mountain home and fail of being invited to alight and come in. If the hour is within prospective reach of meal time, he must draw up at the table. Through the course of a delightful repast of deliciously cured ham, mealy potatoes that would fall out of the jacket like flakes of snow, excellently cooked lye hominy, baked apple, corn bread and buttermilk brought cold from the springhouse, the conversation took an intimate turn. The farmer could support his family to the extent of his limited opportunities, but his abiding worry was how should he ever educate his children. He was a man of intelligence and his children were bright-eyed and alert; their faces were brightened with a new light of hope as they realized the prospect which was being unfolded. Mr. Tompkins had found that the farmer rented his tract of land; that the regular process had been one of moving from this farm and that in hope of bettering his situation. He was all attention when suggestion was made that the next time he moved he might benefit his condition by moving, not to another farm, but to a cotton mill. Mr. Tompkins was owner of a mill in Charlotte, and left the proposition with the farmer that when his lease had expired and he had discharged all his obligations, he might come to the cotton mill in Charlotte and locate in a comfortable home and himself and children of lawful age secure employment in the mill.

Two years later Mr. Tompkins received a letter from this mountain farmer saying he had arranged to make the shift. Mr. Tompkins advised the superintendent of the Atherton Mills of the new accommodations to be provided, and in a few days William Johnson, for that was his name, arrived with wife and children. The family was installed in a cottage that was provided with water, lights and sewerage. The father, with two boys and the oldest girl, went into the mill; the mother and the children remained in the house engaged in household duties. The mill work was entirely new to the man and his children, but by the end of the first year all were on the payroll of

"efficients." The wages during the first twelve months were but nominal, but they were able to save a small surplus, because water and lights were supplied free, coal at cost and the house rent practically nothing. The condition of the family had been much improved at the end of the second year. On Christmas Day of the third year there was turkey on the table and an accumulated saving of $3000 in the bank.

Meantime the size of the family had been reduced. The older boy, after a brief experience in the mill, had gone to the textile school at Raleigh, from which he shortly graduated as an expert designer and later secured remunerative employment in one of the Cannons Mills. The oldest daughter was in the Charlotte High School, from which she later graduated and became a year after the wife of a cotton-mill superintendent. The father, on leaving the mill, was rated as a man of means. One of his proudest investments was the purchase of a tract of mountain land, upon which he built a modern home and where, if yet living, he is engaged in dairying and cattle growing.

This is the story of what opportunity has done for one family characteristic of the class from which the native cotton-mill labor of the South is drawn. It can be duplicated in hundreds of cases and it is presented as typical of all. Technical skill was latent in this family, as it is in all the Anglo-Saxonism of the Southern states. The incident is illustrative of the predominating thriftiness, the moral worth and adaptability of Southern labor to skilled employment.

Types of Southern Cotton Mill Employes and of Cotton Mill Mothers and Their Babies

That was in the pioneer days when the general supposition was that the native labor of the South was good enough on the coarser "counts" but was impossible on the proposition of the finer goods. But the managers of the cotton mills were inclined to profit by observation. They gave the native labor a higher chance. The first experimentation was on mercerized cotton goods. Native labor proved instantly equal to the occasion. Encouraged by the rapidly developed skill of the native labor, the mill men went into re-equipment of their plants with machinery for production of the finest class of goods known to the textile industry, and so it has come to pass that the South is now competing in active manner in the full scope of the field of textile manufactures. The native labor has not only developed the skill, but it has maintained its reputation for responsibility, recognizing that what benefits the mill managements benefits themselves. Their dominating impulse, therefore, is for the largest production with the fewest flaws.

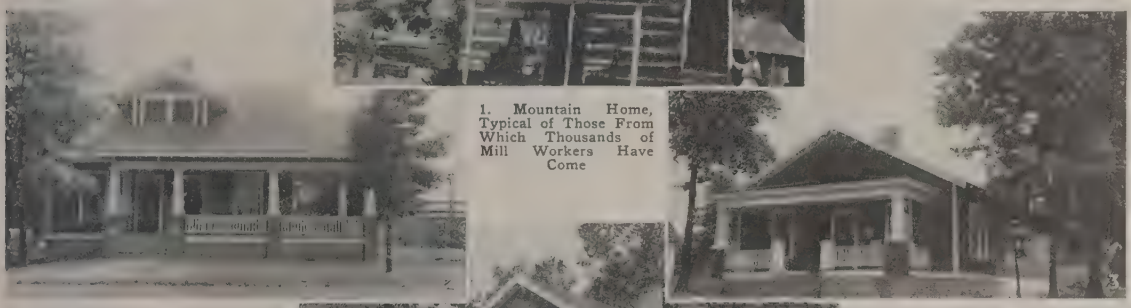
The particular family to which I have thus referred represents a type of what might be called the well-to-do people of the mountain regions in contrast with a much larger number of extremely poor families who, on their little mountain farms, eked out a bare existence, with scanty food, living in log huts of the poorest character—starved mentally, physically and spiritually. It is to this class especially that the cotton mills of the South have come as a great missionary force. These mills have drawn thousands of such families from a little bit of land wholly unfit for cultivation and a tiny log hut into which a whole family was crowded. For the first time in their lives these people have come into a community life through employment in the cotton mills. Community life and steady employment at wages which they never dreamed of as a possibility on their little farms in the mountains have wrought a complete revolution in them and in their lives. They were of an arrested development, a people who had not progressed generation after generation, because, far away from any market for their products or their work, they lived in direst poverty and deepest ignorance so far as book learning was concerned. But even this class of the mountain people who have gone into the cotton mills always had native intelligence and an inherent ability to learn, whether it be the learning of books or the learning of technical skill in the handling of machinery. Drawn by the attractions of profitable employment, they have flocked by the tens of thousands into the mill villages of the South. There they have developed mentally, physically and spiritually. For the first time in their lives the minister of the Gospel and the school teacher have been able to reach them and they have been eager to hear the message of both.

The Manufacturers Record has often said that in proportion to the length of time covered and the capital invested the cotton mill industry of the South has done more for its employes than any other industry in the world's history. Contrast the difference between these people and the foreigners in New England and the difference in management. Mr. Tompkins often said when he visited New England mills, and went through them with one of their officials, the official would never recog-

nize a single man or woman in the spinning or weaving departments, never utter a kindly word to them, never a nod to them. The whole performance was strictly mechanical. "On the other hand," said he, "a cotton-mill official or superintendent in the South knows many of his employes by name, speaks a friendly word to them as he passes through the mill, nods to this one and to that one, commends a good piece of work or kindly points out some mistake that is being made."

Years ago the mills began a rivalry in building better homes and providing more facilities for their employes, not only from the humanitarian point of view but because they realized the better the homes the better the class of workmen they could secure and the greater would be the proficiency of these employes.

1. Mountain Home, Typical of Those From Which Thousands of Mill Workers Have Come



2, 3, and 4, Typical Homes in Which Operatives Now Live in Southern Mill Villages

The photographs accompanying this article, taken here and there in different parts of the South, show the character of these employes more strikingly than any words that I could write. Here are strong, clean faces of men and women. Here is inherent intelligence. Here is integrity and morality of character. Here is the real Anglo-Saxonism of the South expressed in the faces of these modern mill employes. It would be difficult to find in any high school or college in the North or West, much less in a factory in those sections, such splendid types of young men and women as a whole which are shown in these group pictures, as well as in the individual pictures of young women with their babies in their arms. These are all cotton-mill people, and they are typical of the mighty host of cotton-mill employes in the South. And, too, I am presenting a picture of a typical home of the poorer classes of these mountain people, who, leaving such huts, now occupy a comfortable, well-furnished, modernly equipped cotton-mill home. Neither picture is in the slightest overdrawn; they both represent true types. One was almost universal in the mountains, the other is almost universal in the cotton-mill village.

The conditions which prevail in the Carolinas are exactly the same as those in Alabama and Georgia and elsewhere. There are cotton-mill villages in Georgia which match anything in any other part of the South, and these model villages, with all modern improvements to increase the comfort of living and the opportunity of religious and educational advancement, have been the work of Southern men, many of whom have grown up in the cotton-mill industry. Some of the Northern mill people who have established big plants in these states have vied with Southern mill owners, but have never surpassed them in the comforts and conveniences of their mill villages.

In the mountain district of the South, from Virginia through the Carolinas and Georgia and Alabama and on to some of the more distant states, there are several million of these Anglo-Saxon people, in which big families are still the rule, pouring out as from a great hive a swarm of intelligent, thrifty boys and girls who, under proper training, are becoming the best mill operatives in

CAMPFIRE GIRLS OF A SOUTHERN COTTON MILL

the world, just as many of them are succeeding in every line of activity—in the law, in the preaching of the Gospel, in banking and other operations.

No labor in the world is more responsive to the advantages of its surroundings. The mill help in the South attends the finest churches in the section; a church for each denomination, with the best preachers that can be drawn from Convention, Conference, Association or Synod. The children of the mill people have the advantages of standard schools, with longer terms and with better paid teachers than are provided in state schools or in schools maintained by municipalities. They have Young Men's and Young Women's Christian Associations, community-houses, gymnasiums, ball grounds, play grounds and recreation parks. Around every house is a plot of land from which garden truck is supplied the year round. The front yards are converted into flower gardens, and the annual flower show staged by the mill people is an event in all Southern textile communities. These churches and schools, playgrounds, gymnasiums, community-houses, halls and parks are provided by the mill owners. In some cases, where the mills are located in proximity, the managements pool their issues in providing for the comfort and welfare of the labor. A notable example is developed at Greenville, where the Woodside and a number of affiliated companies have joined in purchase of a tract of 1000 acres of mountain land, upon which is established a great center for recreational, educational and "inspirational" purposes. It is a mountain resort to be used in rotation by the mill families, the season being restricted from May to October. The cottages are flanked by a modernly equipped hotel, and hotel and homes are free to the operatives and their families. A feature of the gatherings is a series of Chautauquas, at which subjects relating to the welfare of the mill people are discussed.

But, comfortable as are the surroundings provided for the Southern mill help, the greatest consideration of all is the established fine health conditions. The climate of the Southern textile field is known as the "Piedmont" brand. That means soft, balmy spring weather, blending into a summer of invigorating atmosphere, which in turn gives way to the Indian summer, which, beginning the latter week in September, often penetrates well into December. Then ensues three months of what is generally termed winter weather, but it is a winter altogether unlike that known in New England or the North. Snow seldom lays on the ground for more than three days at a time. The Southern landscape is practically bare of snow through what is known as the winter season.

The cleanliness of the villages is a marked characteristic of Southern mill life. The scores on health rates figure higher in mill settlements than in either towns or in the country. Every mill community has its welfare officer and its community nurse. The operatives are taught "how to live," and they prove apt students. And along with the good health rating is the lowest death rate and the highest birth rate. The healthiness of the average Southern mill community is based not alone on established condition of good sanitation, but on good food. The gardens of the operatives furnish all varieties of vegetables, and the peo-

1. Cotton Mill School. 2. Cotton Mill Swimming Pool. 3. Champion Basketball Team of a North Carolina Mill. 4. A Cotton Mill Playground. 5. Auditorium of a Southern Cotton Mill

BANNER BIBLE SCHOOL CLASS IN A SOUTHERN TEXTILE COMMUNITY

ple have advantage of the best of country products. Chicken, beef, pork, mutton and fish are abundant. In many communities—in fact, the system is general—the company gives the operatives the benefit of food products at cost.

Again opening the door of opportunity to Southern mill help, the states shave it a point wider than the mill owners, themselves. Opportunity does not exist alone in developing the raw labor into skilled artisanry in the mills. The states have provided textile schools for the rounding out of an education in all lines of the textile industry. These textile schools draw largely from the mills. In only a few cases are students drawn from outside a cotton mill. Few youths, for example, select the textiles as a profession unless they have had some experience in the cotton mill. The mill is the feeder for the textile school. An examination of the roll of the textile department of the North Carolina State College reveals just how wide the door of opportunity is thrown open to the training of Southern textile skill. Two of the young men who have gone from the mills to the textile school and taken the graduating course are now cotton-mill presidents, and two are assistants to the president, which means that they are probably by this time in the president's chair. Twenty-two are superintendents of cotton mills. Others have graduated and are scattered over the South in capacity of overseers, secretaries and treasurers, efficiency engineers, foremen, athletic directors, professors of textiles, designers and demonstrators. One of these graduating students is "owner" of a cotton mill. Two are engaged in official capacity in cotton mills in Shanghai and one in South America. Designers turned out at the textile school are of regular employment in the mills of the South. A dozen or more graduates are experts in chemicals and dyeing departments. Two were drafted by the firm of Marshall Field & Co., with location in New York city. Eight or ten are employed in the large commission houses of the same city. All of these textile graduates are in the class of high-salaried men.

Another great asset of the Southern cotton-mill districts is the atmosphere of contentment which universally prevails and because of the wholesome surroundings under which the operatives live and work. There is no more comfortable class of cottage than the average home provided for the mill labor. As has been stated, the homes are provided with water, lights and sewerage. These are supplied free of cost by the mill managements. The garden cuts down the cost of living and fuel is supplied at

WILLING WORKERS BIBLE SCHOOL CLASS OF A NORTH CAROLINA COTTON MILL

wholesale prices. As an instance, during the recent season of high-priced coal, when it was selling at $14 a ton, the cotton-mill labor in the South was privileged to buy supplies from the mill stocks at from $7.50 to $8 a ton.

Then comes in the consideration of good wages. We might take the case of a man, his wife and family of three children, the latter from 16 to 18 and 20 years of age. It is a family of average workers. The mother stays at home to "tend house"; the father is an ordinary hand at the weaving loom. At an average wage he gets $24 a week. If he is a skilled hand, his pay is more. The children, working as spinners, get $15 a week. Thus the weekly income of these four workers amounts to $69. It is sometimes more; seldom in any case less. It is not uncommon for families of four and five workers to accumulate as much as $4000 in the course of twelve months. Families of $3000 and $3500 income a year are common in the mill communities. The thing that counts is that, for the reasons we have stated, these wages represent almost that much "clear money." If the wage scale may be regarded as low, the costs of living are correspondingly low. The average type of cotton-mill cottage costs $1600 to $1800; in some cases $2000. The ordinary type contains six rooms, including dining-room and kitchen. The rooms, with light and water free, are rented at 25 cents a week. This makes the rental of a mill home $6 a month, or $72 a year, and the vegetable garden is "thrown in."

Naturally the moral condition of a people surrounded by such excellent environment is of a high type. They live in what may be properly characterized as a cultivated atmosphere. There are not only flowers in windows and yards, but there are pianos and organs and victrolas in the parlors. In the domestic arts the mill housewife excels; at the county fairs the mill children take the majority of the premiums. The choir in the cotton-mill church renders a song service which attracts the city dweller; the dressmaker in the mill family numbers among her patrons the most select customers of the adjacent towns. One mill village in North Carolina boasts the "largest Bible class" in the state. The visits of the daily paper are as regular in the suburban mill home as in the banking office in the city. When the political speaker comes along with a date in the local hall, he is met by a "mill hand" who matches him in intelligence and wit. The high standard of education attained by the mill-people operatives is the defense of the Southern textile community against the wiles of the traveling agitator. The Southern mill help has become largely immune from the influences of the outside trouble-breeder; it makes intelligent appraisement of its own condition and prospect, and reaches decision in the light of intelligent facts. It has the right vision of the better things into which it has come, and the policy of mutual concession has become the more firmly planted. When any condition of unrest may arise, there are conferences between the help and the management, and as a general thing the causes of the unrest are removed without friction. The Southern mill help is inclined to counsel first and strike next. By reason of that fact, labor disputes in Southern mills generally find friendly adjustment and strikes have steadily grown fewer. The standard of the average Southern mill operative has been raised to the point when other people are not ashamed to enlist. That explains why there is a tendency on part of the best classes of Southern citizenship to enter active employment in the cotton mill.

And the high standard attained is held inviolable against infiltration of un-American influences. There was once a time when Southern textile interests expressed fear that the coming South of New England cotton-mill capital might result in bringing a pestilence with it—the pestilence of foreign labor. But with the coming of these new mill owners the fears were quickly dissipated. These men gave abundant evidence that they were not coming South to bring New England labor with them but to get away from it.

Back of the remarkable development of the cotton-mill industry in the South is one prime cause. The advance made so far has been possible for one reason alone, outside the natural advantages of the South. The reason is found in the class of labor. The standard qualifications of the Southern textile operative, the full-blooded Americanism that has made of him the staunchest of citizens and the most reliable of workers, the most skilled of artisans, the most co-operative of agencies, the most loyal in mutual interests, the most intelligent of employes, is the force behind the development of the textile industry in the South. The fidelity and skill of the Southern textile artisan is the factor that is pushing the South forward in its swift and sure race for world supremacy in the manufacture of cotton goods.

A SOUTHERN COTTON MILL'S BOY SCOUT ORGANIZATION

Striking Facts About Southern Cotton Mills and Cotton Mill Employes

By Richard Spillane, New York

There is a story told of a boy of the South that might with profit be retold throughout the land. He was born on a farm, and standing one day watching the smoke pour out of the stack of a little manufacturing plant, and knowing something of the cost of and the waste in the use of coal, he declared, so it is said, he would make it one of the missions of his life to banish smokestacks from his native state.

Today that man, James B. Duke, through the Southern Power Co., which he created, furnishes the electric energy that drives one-eighth of the cotton spindles of America. He has reduced the consumption of coal in North Carolina 1,000,000 tons a year. He has harnessed the power of a river to serve the needs of man. He has done a mighty work for industrial development and added greatly to the wealth of his native state and the nation.

He is but one of the many who typify the New South, one of the many inspired by the vision of the South's possibilities.

Nothing in America's industrial history is more romantic than the transformation of the South. Largely agricultural before the Civil War, prostrate and impoverished after it, today the South is the best-balanced and the most self-contained section of the republic.

Queer what changes a few generations bring! When cotton was the undisputed king of the South all the product was shipped away to be made into fabrics to clothe the world. Great Britain grew rich and broadened her world trade through cotton manufacture. New England became the American center of a great textile industry.

Today the spindleage of the South equals that of the North, and along with cotton manufacture the South has developed a great variety of industries. Incidentally the South has come to know that adversity has its uses and its compensations.

The South, in beginning to manufacture cotton, was not altogether handicapped unless it was in the matter of capital. It had nothing to tear down. It had the benefit of the experience of the foreign and domestic spinners. True, it had crude labor, which it had to train, and it could not expect for years to make fine goods, but it started well. It drew its labor from the hill country, where lived about as pure a stock of Anglo-Saxons as America can produce —a proud, independent, none too well educated but a self-respecting people who long had lived far from cities. Hill-billies they are called.

As mills, for the most part, were established away from the cities, the mill owners had to build their own villages and make provision for the need of their workers.

In various instances these mill villages are model industrial communities. Each cottage is detached and has ample ground about it for flower and vegetable gardens. All cottages are electrically lighted. The mill owners help out with churches, movie theaters, libraries, nurseries, hospitals, schools, recreation centers, etc. In some instances, the Woodsides of Greenville, S. C., for example, there are parks in the mountains to which the workers may go in vacation time, the only expense being for their food. At these recreation centers all are on a common level. Class distinction does not go with the Southern white man between white men.

All labor in Southern mills is white, except in regard to cleaners, porters, etc.

Cottages in which mill workers live rent at from 50 cents to $1 per room per month.

The Southern mill worker does not get so much in his pay envelope as the New Englander, but he has more, it seems, than the New Englander has after the latter has paid his rent and other bills. He does not live in tenement barracks as do some New England workers.

It is paternalism in the South, but it is an intelligent and worthy paternalism, and so long as it so continues it would seem certain of success.

In some mills the management have savings banks for employes, and in one instance that came within the attention of the present writer more than 95 per cent of the employes had accounts.

While the system in the Southern mill is paternal, there is a democracy greater than to be found perhaps in any other industry. Feeling that he or she is of as good stock as the employer, the mill worker has no hesitancy about going into the boss' office, sitting down alongside his desk and asking advice on some matter or voicing a protest. They're all of one family. They're all of one community. They're all of the mill.

Some day, if the mill men of the South get a rush of money to the head and leave the management to others, all this may change. If so it happens, the fault will be with the management. At present, however, conditions make the student of industrial relations rub his eyes and wonder if it can be true that good will, understanding, peace and justice have come at last into industry.

The union organizer has hard sledding among the Southern mill workers. In various instances the organizer has had to flee to escape rough handling by those he sought to persuade to "join up." When the worker knows the boss and has known him as his friend for years, the worker rarely is receptive to tales that the boss is a wrongdoer.

Southern mill managers want no Northern mill workers in their plants. Foremen, or persons of high technical training, yes. But not the ordinary mill worker.

They are wise. Those who should know say the basic trouble in the New England mill is the racial mixture. Some generations back the mill workers of New England were almost wholly of English, Irish or Scotch stock. In those days the founder of the mill usually was the manager. Now the properties, grown much bigger, have passed to the third or fourth generations, are corporations, and the descendants of the founders have little interest in the properties except as revenue producers. And the old stock of workers has been supplanted by Italians, Poles, Portuguese, French-Canadians and a mixture of races from nearly every geographical division of Europe.

There is a wide gulf between the office and the working force; not an open door as in the Southern mill village. That gulf, it is feared, never can be bridged.

The foremost textile man of New England tells a story to illustrate how difficult it is for men like himself to make headway under present conditions.

He raised the pay of his workers 10 per cent.

One week later a delegation from the employes came to

him and reported that the landlords of the tenements occupied by many of the workers had raised rents equal to the 10 per cent increase in the workers' pay.

Despite statements to the contrary, there is comparatively little child labor in industrial work in the South.

Here are the latest obtainable statistics:

CHILD LABOR IN SOUTHERN INDUSTRIES

State	16 years or over Male	Female	Under 16 years
Alabama	96,517	10,104	538
Arkansas	47,753	2,099	102
Florida	68,252	5,732	431
Georgia	98,059	23,308	2,074
Kentucky	58,373	10,584	383
Louisiana	87,776	9,341	1,148
Mississippi	54,254	2,826	480
North Carolina	113,352	38,063	6,244
South Carolina	59,011	17,124	3,315
Tennessee	75,515	18,434	1,218
Texas	97,753	9,270	499
Virginia	98,547	19,300	1,505
West Virginia	74,350	8,242	444
Total	1,029,512	174,427	18,381

That is about 1 per cent.

One New England state has 50 per cent more child labor than all the Southern states combined.

When the movement for the establishment of mills in the South started the chief argument in support of it was the economy through proximity to the source of raw material. One of the great objections or difficulties was in relation to labor. Now it appears that nearness to the cotton fields is of negligible worth, while the great advantage is in Southern labor. The bulk of the cotton used in Southern mills comes from Texas, Oklahoma and the Mississippi delta. The cost of cotton to the Southern manufacturer is little, if any, below that to the New England spinner.

Labor is the chief item of cost in cotton manufacture. Power cost is small. Where labor turnover is negligible, as it is in most Southern mills, and production per employe is good, the results are sure to be satisfactory. Such advantage as the Southern spinner has today is wholly through better labor standards.

The greatest labor authority in America says the seat of labor trouble is in the home. If the living conditions of the worker are good, the wife content and the children happy, the prospects are for the worker to be satisfied. But if home surroundings are bad, the wife querulous and the children fretful, the worker is prone to charge his troubles up to the employer. This authority ascribes to the very good cottages, the gardens, the recreation centers, the libraries, the schools, the hospitals and, more than all else, the open door to the boss' office, first the contentment of the worker and the worker's family, and, secondly, the good production of the Southern mill employe.

What of the present and what of the future?

A New England mill man of prominence says wages in that part of the country must be reduced or New England mills cannot compete with the Southern spinners. Confessedly the textile situation in America is difficult. The nation, consequent to overequipment in the war period, has a larger manufacturing capacity than there is of consumptive requirement. Cotton goods are not being used so freely as formerly. Women wear fewer garments. Laundry costs are so high that women prefer to wear real or artificial silks in preference to cottons which must not only be washed but ironed, whereas silks only require rinsing.

This situation may be temporary. Styles change. The style makers see to that, but some persons believe there is a fair degree of permanence to the use of silks.

There appears to be a definite revival in the textile industry in Europe. The cotton takings of Great Britain and the Continent thus far this fiscal year are larger than expected. Whatever may be the immediate market, the fact remains that cotton is the cloth of the world. No other cloth enters in so many employments or is susceptible of so many uses. Stocks of cotton goods are below normal. There would seem to be need for all the cotton in the world today to make into goods or to replenish the stocks of the mills of the various nations.

It may take some few years for America to reach a consumptive point equal to the great increase in the productive capacity of the nation that came with the spur of demand in World War days, but its coming is only a measure of time.

With its coming where may the additions to the cotton manufacturing industry be expected? New England does not seem to have good prospects. Labor conditions there are not, from present appearances, likely to improve. Slowly but certainly industry after industry, once rooted in New England, has drifted in large or small degree westward or southward. New England's destiny seems to be toward the making of finer goods, whether they be of the metals or the fibers, while mass production goes elsewhere.

The South is definitely in the saddle as to cotton. Its advantages would seem to increase more and more so long as it maintains its present strength with labor.

Nowhere else, east of the Rockies, is there so much water-power developed or subject to development as in the Piedmont region. Nowhere else have cotton manufacturers shown such enterprise or capacity in solving the cardinal problem of labor. With labor and power they would appear to have advantages over all others for a considerable time.

One thing the majority of people do not appreciate in connection with a great development like that of the textile industry in the South is the effect upon collateral industries.

Cities have been transformed from drab, dull monotony to throbbing life and energy. Half a dozen states have been reborn. The wealth of the nation has been increased. Living conditions have been improved for countless thousands of persons and their outlook on life and their prospects bettered.

And all because of the vision, the courage and the fidelity of men who loved their homeland, worked for its upbuilding and builded better than they knew.

To Sum Up

THE THREE articles dealing with the labor conditions in Southern cotton mills should forever set at rest the false statements that from time to time have been made about Southern cotton-mill employes. This agitation was started thirty or more years ago in New England for the express purpose of trying to prevent the development of the cotton-mill industry in the South. A Governor of Massachusetts admitted that he had sent two investigators into Southern cotton mills disguised as laboring men or philanthropists in order that they might investigate Southern cotton-mill employment. He did this for the purpose of trying to discredit the Southern industry. About that time muckrakers, labor agitators, sentimentalists all joined in a thorough misrepresentation of Southern mill conditions. It was a campaign of selfish vilification pure and simple.

Southern Industry a Spiritual Movement, Creating a New People

By Rev. J. W. Speake, Pastor St. Paul Methodist Church, Greenville, S. C.

The history out of which my story comes is this: Industry and Agriculture are friends and partners in business.

The Cotton Gin: Agriculture at this point kicks Industry into New England.

Agriculture set up cotton as King, and the King decreed Slavery a righteous and necessary institution. The enmity between the Aristocracy of Agriculture and Industry deepened and widened. What protected one was the enemy of the other.

War came: Industry, which had the power to create the instruments of war, *won.*

Out of war was born: Reconstruction and prostration and the "lien law," and more prostration. Those formerly in industry became as "The Lost Tribes of the House of Israel." "Wandering between two worlds. One dead, the other powerless to be born."

My story begins here, where the rejected and ostracised come out of the night of obscurity to be the cornerstone of a mighty civilization. "These are they which came out of great tribulation."

The story of Southern industry as told in this journal is the fairy story of the century. For the thrill of it, the joy of it our hearts pound against our ribs and swell to choke us almost to death.

Some of us have been too busy in it to see it, some too close to see it, and some too blind to see it. None of us can appreciate it without a knowledge of its historic and spiritual background. To those who can read history the hand of God is so plain that it is unthinkable the story of Southern industry could be attempted by any without an appreciation of it as a great spiritual movement.

Much has been said of the mountains and rivers and scenery of Alaska, but the Klondikers are supposed to have rushed in to the lure of gold. Even our great Dawson, who called us from death to the hope of life under the slogan, "The cotton mills to the cotton fields," did not appreciate the leading asset of the South. He was thinking in the language of defeated agriculture.

There are many reasons why a New Englander lists his New England spindles at $13 per spindle to invest in Southern mills at a rate as high as $84 per spindle, but the primary reason is not that these mills are in the cotton fields, neither is it on account of climate or scenery. Southern progress has foundations not consciously created by man and sometime not appreciated by those who build on it.

Whatever may be said of the negro and slavery as an institution, the black man was the living barrier of flesh against the incoming tide of "foreigners." The black lines held the sea-gates and no living thing got through to Dixie. When we would and when we tried, we could not open the gates, thank God!

In digging foundations for the new building the South found a social stratum of gold of incredulous purity and worth. She had her Klondike, toward which the world will increasingly stampede. The problems of mixed nationalities, the problems of many religions with many conflicting denominations, problems so ably discussed in so many books, are not even subjects of sufficient local application to write about.

Industry found a prepared and waiting people 100 per cent American. In all the world beside there is no other like it. "Labor is the backlog of Southern industry." We have our cotton and many natural resources besides, but when we throw our people into industry we have a glory all our own. I am not speaking in the language of poetry or rhetoric but in the prose of facts. When this God-defended people got their chance, in a half generation they are lifted to altitudes above all others in the fields of industry. The forces that seemingly opposed them protected them and the current that forbade them to cross ferried them over. As an apple tree used for firewood destroys an ultimate purpose, so had we misused these natural children of industry. They are as Divinely correlated to industry as the vocal chords in the throat of a mocking-bird are correlated to song. "We set his sails to the winds blowing eastward, and behold he moved westward."

Industry gathered them together and powers so long asleep were awakened. The eloquence that thrilled our Senates and the blood shed against wrong are in them held in everlasting form. Our furnaces and chimneys and warehouses and buildings get their meaning and reason for existence when we know they are putting in their contribution to the making of folks. Our spindles are whirling, our hammers ringing, and it is music to us because it has power to give increasing worth to the human side of it. The life we are finding is a million times richer than the life we are losing. We are putting in our people and taking out an ever-increasing power to give more. In spite of ourselves we have been working for this hour. The very walls raised to keep the North and South apart have been battered down for material to make the roads that bring us together.

The measure of industry is the human product. Whether we manufacture ships or cloth, if we lose folks in the process, we consume a product for which there is no replacement. Our people went into industry as raw a social product as raw could be. Country and mountain folk generally of crudest form. Illiterate and poor, but moral and religious. They were a "lost" people in the sense that they had established no worth-while economic relations. If you had blotted out this half-million people now making our Southland so glorious, the social and economic order of the world would not have had a jar. They were not even units in the world of economics; they were fractions. The denominator was large, but the numerator was small. They were on the right of the decimal point far removed. The decimal point is now on the right and in many instances far removed. Then they were neither producers nor makers—now, if you should lose them out of the world of textiles alone, where they are manufacturing 63 per cent of the raw cotton used in this country, you would shake the world and well-nigh ruin our nation.

I would not hesitate to say that those who are in Southern industry are a class. This is particularly true of those in cotton mills. I would teach them the wonderful

achievements of industry, and if they would accept me as worthy I would identify myself with them and with them proclaim the pride and glory of it. No cotton mill has successfully recruited its labor from the idle or helpless of any town or city. They all came from the surrounding country or from the distant mountain coves.

The loyal subjects of King Cotton, though broken in spirit and wrecked under the "lien law" and other oppressions, still felt themselves of royal lineage. Better starve in the broken-down Kingdom of Agriculture in loyalty to its King than to go to a cotton mill. Those who went told their relatives goodbye as for a far journey. Indeed, it was a far journey into a land unknown and untried. Elimelech and Naomi leaving their beloved land did not face the land of Moab in deeper distress. Girls stood in a strange world of noise and machinery and their tears dropped on the white cloth they were weaving. How could they know that, like the Joan of old, they were weaving with their own hands the flag of a new Kingdom which in the plan of God was to become a mighty Empire?

They tell us that the difference in us is the difference of opportunity. There is a difference wider than this. They tell us that equality in opportunity will make us equal, and it isn't true. An equal opportunity makes us unequal and unlike by developing the mysterious thing in us we call personality. Because of an unseen and unknown deposit in these undiscovered folk they are immediately lifted by opportunity to the mountain heights. The ideals for which the South has so stubbornly clung came to the surface in a generation. They now belong in the Kingdom of Industry and are proud of their kingdom.

Much of the capital stock of the Southern cotton mill is invested in houses, streets, sewerage, school buildings and schools, churches, lodges, playgrounds, "welfare work," clubs, etc. But they tell us "this is rank paternalism and the thing you boast of is your ruin." "I am my brother's keeper" is paternalism. "I am my brother's brother" is Southern industry. "I have a pain in my side" is the cry of hurt paternalism. "I have a pain in my brother's side" is Southern industry. I quote an outstanding Southern manufacturer: "Our employes speak the language of the management, cherish the same traditions and are moved by the same sectional pride." The cloth side of the loom is of no greater concern to the manufacturer than the man side. "Every time I ship a yard of cloth out of my clothroom I ship the character of the people who make it." "The composite character of mills is loaded on cars every day in the year, and the more I can build up the character and broaden the view, the more goods I can make and the more dollars I will make." "The only way to get quality is to improve living conditions—the outlook, the horizon—by giving the people better churches and better educational facilities." "I think the South in this way is now leading."

There are no better schools in the South than those now found in textile centers, where the buildings were erected entirely by the corporations and where the school is supported largely by the "company." A New Englander on seeing the children pouring out of one of these schools is quoted as having said: "Well, you've got us beat. We have no such children as these." The writer of this article lives in a town on the outskirts of which is a school district that enrolls more than 5000 white children; more than any other district in the state; children of industry, all of them; "Anglo-Saxon," whatever that may mean. Nearly all are adherents of one or two Protestant churches. More children here than are found in any one of 31 counties in the state. The church of their choosing can have them any day in the year for religious training and instruction when the church is prepared to give adequate instruction. I submit that nowhere else on the top side of this world is there a like opportunity.

"William Gregg," says Mitchell, "was the founder of modern Southern industry." Then William Gregg was a prophet of God, for he withstood the great Calhoun to his face and denounced the pride of agriculture, plead with the legislature for a charter because he saw that in industry the "poor whites" might have their opportunity, and through industry the state he loved might receive her enslaved children again an economic asset. He had written into the charter, which he obtained only by agreeing to take half the stock, the clause prohibiting the sale of any intoxicating beverage. He further stipulated in the deeds furnished the churches that they must sell no whisky.

He established compulsory education by making his people pay ten cents per day for children out of school. He gave "prohibition his physical as well as moral support." William Gregg held that you cannot build successful institutions upon immoral foundations. Those who came after him followed his example, and nowhere has successful industry been indifferent to morals and religion. Our real leaders of industry have supported both prohibition and compulsory education. No man can get a job in a reputable cotton mill in the Piedmont when his citizenship or morals is in question. To get a job we must all furnish a certificate of character.

What we think of each other is the difference between civilization and chaos. As you gather from this article, we like ourselves and we love and appreciate each other. "Good will and ill will are not sentiments that trickle down from above. They come into existence at the foundation of the social fabric." In this labor-torn country of ours "good will" needs a home. We want our South to be its home. "The first step in dealing with those who see red is to be sure there is no red to see." "For the ills arising out of social injustice, social justice is the cure." We want to keep our relations right, our thinking right and our feeling right. The only efficient law of peace is the spirit of peace. If we have the spirit of it, a "little child" can write the law of it, and without the spirit neither labor unions nor legislatures can write it.

The moral equivalent of all effort going into the task of bringing the spirit of co-operation out of industrial war we want to invest in a peace-time service as our debt to conscience, patriotism and history. The duty allotted to each of us in Southern industry—preacher, leader, stockholder, employe—is the duty of being a *good will maker.*

We don't want any boll-weevil ideals destroying our luxuriant gardens of industry. We don't want any bolshevistic invasion of our industrial "Garden of Eden." We don't want the kind of grain sown in our fields that is sown by the one who comes and sows while we are asleep. The spirit of Southern industry is the spirit of the neighborhood. We don't want outside peddlers and quacks putting green glasses or red glasses on our clear-visioned people.

There is a difference in Dixie. Let those who come South know the difference or there will be no difference. Let those in the South remember the difference or there will be no difference. A leader looking carefully at the human product in Southern industry said: "I believe we have developed a new race of people. The present type is so unlike those we began with." The growth of our people under the leadership of public school teachers, social workers, all extra and intra-church movements has been so tremendous that the product seems to some "like a new race." The unfortunate thing is that the leadership passes from the home into the hands of the "leaders." Our leadership must stay right.

Here is a picture of the product: The writer received a ticket to a basketball carnival from the Southern Cotton Mill Athletic Association. The carnival was to be held in the big Textile Hall at Greenville, S. C. The contest was on from Virginia to Georgia. Some of us looking on at this carnival were looking on in the days when the parents of these contestants drove into the cotton mills out of poverty and social neglect. Here are their children. Sixty-three teams with their followers and trainers. Beginning in the morning at an early hour, without intermission for three days, six teams were on the floor. Many of them grammar and high school boys and girls. None were eligible unless they were of the cotton mill. I rubbed my eyes in wonder and amazement. I saw poise, beauty, purity, Christian character, "self control at the point of highest tension"—hundreds of them — straight-limbed, straight-looking, straight-living youngsters. Out of the night of yesterday could there be such a today! If industry in the world has a better lot than these, I am in ignorance. Industry anywhere to beat us must make better folks than ours. I said in my heart: "What we lost at Appomattox we will win back on the plateau of the Piedmont." Whether in competition with Switzerland or New England, in the realm of the liberal arts we are slated to win. In the race for supremacy I heard pistol shots—I saw them off like a flash. I thought of the past in sorrow, of the present with gratitude to God, and, lifting my hat, I said again in my deepest heart: "Glory of the Future, I salute Thee!"

The industrial South is triumphantly winning the race.

Artificial Silk a Commercial Romance

The South Has Two Large Artificial Silk Plants in Operation, Two More Under Construction and Others Projected, All Representing an Investment of Many Millions of Dollars

By L. A. Yerkes, President du Pont Fibersilk Company, Wilmington, Del.

Two recent developments in this industry have intensified the public interest in artificial silk. For years artificial silk in the minds of the public has been a vague and uncertain thing, little known and not at all understood.

The two facts mentioned which have undoubtedly created widespread interest are, first, that the world production of artificial silk has, after little more than twenty years of intensified manufacturing, advanced to the state where the production is larger than that of the worm or cocoon silk.

The second factor is that within the past six months a name has been suggested and adopted by a large number of manufacturers and consumers of so-called artificial silk. This name, "Rayon," can only during the course of years place this wonderful new textile in a field all its own. The adoption of the word "Artificial Silk" at the conception of the industry was probably the worst thing that has ever happened to it.

Artificial silk is just as separate and distinct a textile fiber as cotton or wool or hemp or natural silk, and it is believed that the adoption of a name of this character will put the industry eventually in a separate and distinct place of its own where it undoubtedly belongs.

The bare fact that an industry could in the short space of twenty to twenty-five years, starting from nothing, increase its production rapidly and steadily to a point where it is estimated that in 1924 probably 70,000,000 pounds will be made in the entire world, is in itself sufficient evidence not only of the romance of this industry but of its stability, and the end is not yet in sight.

Artificial silk was first produced by Count Hilaire de Chardonnet about 1884. It was exhibited at the Paris Exposition in 1889, and very shortly after this the original commercial plant was started at Besancon, a small town in northeastern France.

The big development of the industry, however, began about 1903 when Stearn, an Englishman, discovered the so-called viscose process which is now so largely used. The world production today is probably 75 per cent made by this process. There are many other processes in practical use today and new ones are being developed, the nitro-cellulose process, the cupra ammonium process and the acetate process being the other important ones at the present time.

The viscose process being by far the largest, it might be interesting to give a short résumé of the way this fiber is made.

The principal raw material used is sulphite wood pulp of special purity. This wood pulp, usually in the form of sheets, is saturated with caustic soda, pressed, shredded into fine particles and afterward treated with carbon bisulphide. This forms the so-called cellulose xanthate, which is dissolved in water and used for the spinning operation. This is the operation where the actual filament or thread is produced. The solution is forced through a fine spinning nozzle containing a various number of minute holes which vary according to the size of the thread desired to be produced. Some artificial silk fibers run as high as sixty separate filaments in one thread; the higher the number of filaments the softer and more lustrous is the finished article. The thread as it is forced through these spinning nozzles is precipitated in a bath containing sulphuric acid, which sets or forms the thread. It is then properly washed and dried and bleached, if required, tested, and usually put up in skeins similar to natural silk. In this condition it is sold to the various manufacturers, knitters, weavers, etc.

All processes for the manufacture of artificial silk are, in a general way, similar. They all use as their base cellulose, either in the form of wood pulp, as stated above, or purified cotton, and the general methods of spinning and manufacturing are more or less similar.

The industry was started in this country in 1910, during which year approximately 1,000,000 pounds were produced. Each and every year since then has seen a phenomenal advance in the amount of yearly production, in many years the output being actually double that of the year previous, until 1923 there was an estimated production in United States of over 33,000,000 pounds, which will be increased to 35,000,000 or 38,000,000 in 1924, with other large increases in sight.

With the above short history of the industry in mind, the question will naturally be asked, Where does all of

this product go, who uses it and in what industries and how?

A list of the uses to which artificial silk is put at the present time means almost a complete textile directory. It is used in large quantities by all the knitting trades, by all the weaving trades, silk, cotton and wool; by millinery manufactures, in the plush and velvet industries, in ribbons, braids, underwear, and, in fact, by practically every industry which could be classified under the general name of textile.

The original industry to take up this fiber in this country was the knitting industry, and today the largest consumption is still in the manufacture of hosiery for men, women and children. It is true, however, that the predominance of the consumption in the hosiery industry is not as great as it was a few years ago; other textile manufacturers are coming more and more to the use of artificial silk either in combinations or by itself.

In the manufacture of hosiery artificial silk is used mostly in combination with cotton and with silk or wool, although large quantities of stockings are made entirely of artificial silk. It is easy to imagine the beautiful combinations which can be made in hosiery by the use of artificial silk and wool, for example, or any of the other mixtures.

Everyone is familiar with the tremendous strides which the outerwear knitting trades have made in the last five to ten years. The recent fashion of knitted dresses is familiar to all, as well as that of sweaters. In all of these outerwear knitting industries artificial silk is used in enormous quantities. Its beautiful luster and exceptional wearing qualities, together with its comparatively reasonable price, makes its place in the knitting field a permanent and ever-increasing one.

The weaving industries were perhaps behind the knitting industry in adopting this fiber, but during the past few years the large silk manufacturers as well as the large cotton mills have seen the possibilities of using in combination this fiber and the effects obtained have been beyond conception, and there is absolutely no limit to the uses to which artificial silk can be put in these industries. New cloths are continually being produced and effects obtained which are absolutely impossible by any other methods.

The weaving of artificial silk ribbons is another industry which has recently taken up this fiber, although these ribbons have been made in Europe for a number of years. The ribbon manufacturers today are using ever-increasing quantities, and the reception in this industry is similar to that of all others.

In the manufacture of velvets and plushes and imitation furs articles are produced by the use of artificial silk which would undoubtedly astound the average person if he realized they were made from artificial silk. The effects obtained are beyond description.

The large cotton mills in the South are using enormous quantities of artificial silk both in the manufacture of dress goods and in draperies, bedspreads, etc.

One of the most recent developments, and one which in itself is bound to increase tremendously the consumption of artificial silk, is the manufacture of underwear. Due to the improved methods of manufacturing this fiber which have been gradually developed in the past year, a thread is now obtained which can be knitted into a fine undergarment which is fully as soft and as pleasant to the skin as the finest Japanese silk, and which can be produced at very reasonable prices and within the reach of everyone.

Even more recently the woolen dress goods industry has shown considerable interest in artificial silk, and we believe that this will be one of the next broadening developments of the textile industry in the use of this fiber.

Artificial silk, or Rayon, as we believe it will eventually be called, is unquestionably one of the commercial romances of the last twenty-five years. The merit of the fiber was doubted for a long time. That time, however, was passed many years ago. The fiber as produced today is beautiful in appearance, soft, strong and entirely distinct from any other vegetable fiber. The product has made its way by the sheer weight of its own worth. What the production will be or to what further uses it will be put during the next generation one can only imagine, but certainly the industry is still in its infancy.

The South Controls the World's Sulphur Production

PURE SULPHUR is called the king of chemicals, because it is the king of purifiers. It is the most widely used single commodity essential to the pharmaceutical trade. It is also the farmer's best friend, the paper manufacturer's best friend, the rubber-tire manufacturer's best friend and the oil refiner's best friend. In addition to its utilization in practically every form of industry, it enters into the make-up of both vegetable and animal tissue, and is consequently essential to life itself.

Eighty per cent of the world's supply of sulphur comes from the United States, and the coastal plain of Louisiana and Texas now furnishes 99 per cent of the American supply. Previous to 1890 the Island of Sicily virtually had a world monopoly, but since then the South has increased its annual production from about 3000 tons in 1900 to 250,000 tons in 1910 and 2,036,000 tons in 1923, of which 1,618,841 tons, valued at $26,000,000, were shipped from the mines. Both production and shipments reached new high levels in 1923, the previous records being 1,879,150 tons produced in 1921 and 1,517,625 tons shipped in 1920.

Stocks of sulphur were nearly 2,900,000 tons at the end of 1923, practically 1.8 times the shipments for the year, so that if production should cease entirely, shipments from stocks could be maintained at the record high rate of 1923 for nearly two years.

SOUTHERN SULPHUR PRODUCTION AND SHIPMENTS

Year	Sulphur mined Long tons	Sulphur shipped Long tons	Sulphur shipped Value
1911-1915 (5-yr. avg.)	484,430	302,861	$5,330,000
1916	649,683	766,835	12,246,000
1917	1,134,412	1,120,378	23,987,000
1918	1,353,525	1,266,709	27,868,000
1919	1,190,575	678,257	10,252,000
1920	1,255,249	1,517,625	30,000,000
1921	1,879,150	954,344	17,000,000
1922	1,830,942	1,343,624	22,000,000
1923	2,036,097	1,618,841	26,000,000

Sulphur was discovered in Louisiana in the early sixties by a prospector looking for oil. At about one thousand feet below the surface he found a mass of pure sulphur 100 feet in thickness. All efforts to mine the sulphur at that time by shaft-mining methods were futile, for a barrier of quicksand lay between it and the surface. Sulphur having been found in enormous quantities, it only remained to devise some method of extracting it. Herman Frasch, a practical driller, refining expert and chemist, supplied it by introducing superheated steam, which forces the sulphur up through pipes, where it runs out on the ground, and in a few hours returns to its original crystal form.

Story of the Origin and Development of the Fertilizer Industry

By Charles A. Whittle, Secretary Soil Improvement Committee, Southern Fertilizer Association, Atlanta, Ga.

The fertilizer industry of the United States had its inception in South Carolina with the discovery of deposits of phosphate rock. The conversion of this and other deposits of phosphate rock in Florida and Tennessee called into existence and largely accounts for the development of an industry doing annually a business amounting to $300,000,000 in supplying farmers with commercial plant food.

Charles A. Whittle

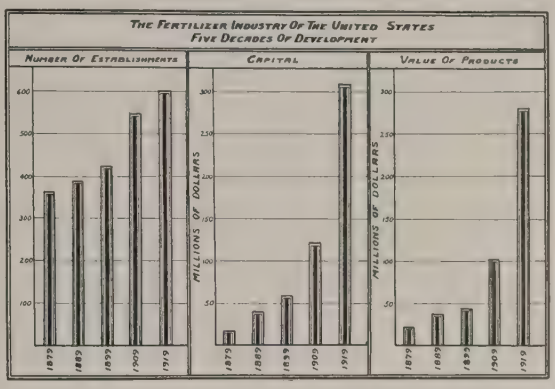
It was in 1860 that Dr. Nathaniel Pratt of Charleston, S. C., found by chemical analysis that rocks in that vicinity, which had been in disfavor because they interfered with cultivation, contained a high percentage of phosphoric acid.

But it was not until after the Civil War that it was learned that Liebig, the German chemist, had discovered that phosphates in rock phosphate could be made readily available as plant food by a treatment of sulphuric acid. This discovery was put to practical application, and in 1869 and 1870 the first acid phosphate for fertilizing purposes was produced. Capital was enlisted and soon there were furnaces for burning brimstone to produce sulphuric acid and lead chambers in which to store acid.

The first acid chambers were erected by the Wando Company on the Ashley River on the site of the rock phosphate deposits, and almost coincidently the Etiwan Fertilizer Company erected a set of chambers on a still larger scale on the Cooper River near Charleston.

Then came a period of experimenting to produce fertilizers that would supply phosphates, ammonia and potash. It was an adventure without precedent. Problems which now seem to be so simple presented then almost insurmountable obstacles. Enthusiastic chemists spent much energy and capital and found success elusive. But eventually success was attained. The problem of manufacturing a practical commercial fertilizer was solved, and the great fertilizer industry of today stands as a monument to that group of Charleston men with a vision who labored so ardently more than half a century ago. Chief among these pioneers were: Dr. Nathaniel Pratt, Dr. St. Julian Ravenel, Dr. C. V. Sheppard, Prof. Francis Holmes and Albert Rhett. From the small beginning in 1869, the fertilizer industry has grown until in 1920 the United States had 600 factories representing $311,633,259 of capital invested; an output of more than 7,600,000 tons. The growth of the industry by decades is given in the following table and in the graph portraying the figures:

	Factories	Employes	Capital	Value Product
1879.....	364	....	$17,913,660	$23,650,795
1889.....	390	....	40,594,168	39,180,844
1899.....	422	11,581	60,685,753	44,657,385
1904.....	399	14,184	68,917,264	56,541,253
1909.....	550	18,310	121,537,451	103,960,213
1914.....	784	22,815	217,064,890	153,196,152
1919.....	600	20,296	311,633,259	281,143,587



The Fertilizer Industry Of The United States
Distribution Of Establishments
Each Dot Represents One Establishment
U. S. Census 1920
Prepared By David D. Lowe
Soil Specialist
Soil Improvement Committee
Southern Fertilizer Association

In the development of the manufacture and distribution of fertilizers the Southern states lead. Of the 600 plants in the country 432 are in the South. Of the $311,000,000 of capital invested over $200,000,000 is invested in the South. Of the 7,600,000 tons of fertilizer distributed in 1920 the Southern states consumed about 5,000,000 tons.

Fertilizer Industry in Southern States, 1920

State	No. Plants	Value Products	Distribution (Tons)
Georgia	144	$47,480,000	978,090
Maryland	45	37,014,000	173,000
South Carolina	50	30,412,000	1,253,890
North Carolina	45	27,551,000	1,221,796
Virginia	43	22,891,000	429,024
Alabama	40	11,625,000	388,341
Florida	24	10,686,000	272,316
Tennessee	10	6,842,000	112,202
Louisiana	6	4,197,000	95,864
Mississippi	9	3,627,000	139,000
Texas	9	1,593,000	56,700
Kentucky	4	1,000,000	90,000
Arkansas	3	*800,000	81,875
Total.....	432	$245,788,000	5,292,098

* Estimated

Since the census report of 1920 was completed the deflation period set in, dealing a very hard blow to the cotton farmer, a blow that was reflected by heavy losses to the fertilizer industry. The census figures for a number of fertilizer factories in 1920 are therefore greater than for the present time. Though the effect of the deflation was felt in reduced tonnage, yet in this respect the industry has regained practically all the lost ground. In 1923 the fertilizer consumption given in the table was practically 5,000,000 tons for Southern states.

But the tonnage of 1923 was of higher plant food content than for the year 1920, or for any previous year. So, the fertilizer industry has more than recovered lost ground in the consumption of plant food units. In fact, 1923 marks the banner year in fertilizer history for actual plant food sold in the Southern states.

Evolution of the Industry

Returning to the historical phase of this article: The first commercial fertilizing material of any consequence sold in this country was Peruvian guano, the cotton and tobacco planters being the largest purchasers. The high nitrogen content of that material made cotton and tobacco too "weedy," that is, there was too much vegetative growth to the plants.

When it was revealed that guano mixed with acid phosphate held down the stalk growth and caused better fruiting the cotton growers were glad enough to use the mixture. Likewise the tobacco growers, finding the quality of the leaf improved, preferred the mixed fertilizers.

Then potash was added to the mixture and still better results were obtained. Thereafter the farmers of the Southeast used complete fertilizers.

The question of what proportion of each element of plant food and what quantity would give the largest profits had not been answered by the agricultural experiment stations, and it remained for the farmers and fertilizer chemists to feel their way.

It speaks well for the intelligence and diligence of the cotton and tobacco farmers of the Southeast that they worked out fertilizer analyses that were so nearly exactly correct that Southern experiment stations after many years of work have only confirmed what the farmers had found out.

Having learned that nitrogen accounted for the vegetative growth of plants, phosphoric acid for their fruiting and maturity and potash for vigor of plants, resistance to disease and quality of product, the farmers observed the development of cotton and tobacco under varying treatments, and by adding a little here and subtracting a little there standard analyses fertilizers for cotton, corn and tobacco were developed which thus far have not been materially changed by the more elaborate studies of the scientists.

As soon as fertilizers consisting of three elements of plant food came into use there began to open up from time to time various sources of these elements. Nitrate of soda from Chile, cottonseed meal from the cotton oil mills, sulphate of ammonia from the coke ovens of the steel plants, packing-house products, such as dried blood, tankage and fish scrap; garbage tankage from the urban recovery plants, cyanamid snatched from the air by the electric process, and other sources contributed in time to supply nitrogen for mixed fertilizers.

Packing-houses have contributed ground bones and blast furnaces of steel plants have yielded basic slag to supplement acid phosphate as sources of phosphates for fertilizers. New deposits of rock phosphate have been discovered in the Western states, too far from the center of consumption now, but they exist for future use and afford a sense of freedom and security concerning a supply of phosphates for a long time to come.

By the fortunes of war the one great source of potash is no longer monopolized by Germany, but is shared with France. Also, by the fortunes of war, the United States, finding itself cut off from the German source, turned to its briny lakes of the West to extract therefrom their potash contents, with such success that but for cost of transportation to consuming centers America would probably dominate its home market in potash today.

The resourceful Southwest has also revealed in the borings for oil in Texas the possibilities of developing great deposits of potash similar to those in Germany and France. How great these may be and what commercial possibilities exist await the explorations of geologists.

Here is an economic fact of great significance: *Whatever may arise to isolate the United States, this nation will have what no other nation possesses, that is, all the essential elements of commercial plant food within its own borders.*

Development of Phosphate Rock

The mining of rock phosphate in this country is confined almost wholly to Florida, Tennessee and South Carolina. Florida is now producing about four-fifths of the phosphate output, and most of this is derived from its land pebble deposits. Tennessee follows Florida, while South Carolina, the first to develop rock phosphate, has almost dropped out. Kentucky, Idaho and Wyoming have made small shipments. South Carolina's largest production was in 1894, when there was an output of 450,108 tons. In 1906 Florida deposits suddenly came into development and at once went ahead of South Carolina and Tennessee. Florida's greatest output was in 1920, when it reached 3,369,384 tons. Tennessee, with a 19,188-ton production in 1894, reached 654,641 tons in 1907, but has never exceeded that, the average being more nearly 400,000 tons in later years.

The tonnage output of the three states since 1906 is as follows:

Southern Rock Phosphate Production

Year	Florida Tons	Tennessee Tons	South Carolina Tons
1906	1,304,505	499,815	223,675
1907	1,357,365	654,641	257,221
1908	1,692,102	415,388	225,495
1909	1,779,702	348,841	207,954
1910	2,067,507	409,684	179,659
1911	2,436,248	542,761	169,156
1912	2,406,899	443,065	131,490
1913	2,545,276	451,559	109,333
1914	2,138,891	483,000	106,919
1915	1,358,611	390,000	83,460
1916	1,515,845	412,000	53,047
1917	2,022,599	513,107	33,485
1918	2,067,230	374,535	37,040
1919	1,660,200	534,025	60,823
1920	3,369,384	634,848	44,141
1921	1,780,028	277,706	.....
1922	2,058,593	353,309	1,500
1923	2,555,410	437,900	.....

From 1890 to 1923, inclusive, 11,054,763 tons of Florida hard rock and 5,969,731 tons of Florida land pebble have been exported. In recent years the demand for land pebble for export has increased until it annually exceeds the exports of hard rock. The point of shipment for land pebble is Port Tampa; hence it has become the chief port of phosphate export.

Sulphuric Acid Production

Fertilizer manufacturers have been the largest producers of sulphuric acid, theirs being the largest requirement. For a long time pyrites drawn principally from Spain was the chief source, but when the World War cut off the supply of Spanish pyrites fertilizer manufacturers turned to the sulphur deposits of Louisiana and Texas, installed sulphur burners and met their requirements of sulphuric acid. But previous to the World War the Tennessee Copper Company had been compelled by injunction to precipitate the fumes of the copper ore roasting beds to protect surrounding vegetation. At the breaking out of the war this large supply of sulphuric acid was then being turned out, but this and other acid production was in demand for war purposes.

At the close of the war fertilizer manufacturers found themselves with sulphur-burning equipment and production cost that no longer made pyrites essential. Furthermore, the peace-time output of sulphuric acid of the Tennessee Copper Company was available and Southern fertilizer companies have to a large extent found it unnecessary to operate their sulphuric-acid producing plants.

To what extent the fertilizer manufacturer will be a producer of sulphuric acid is uncertain, but the industry may continue to be a large producer of sulphuric acid as well as a large consumer of it in acidulating rock phosphate and other materials used in mixed fertilizers.

According to the census of 1920, there were at that time 216 sulphuric-acid producers. For reasons mentioned, and doubtless for other reasons, not all of these are now operating.

The United States Department of Commerce, reporting for the year 1923, states that 1,820,278 tons of sulphuric acid were used in 1923 in the manufacture of fertilizers, compared to 1,589,809 tons in 1922. Of the amount produced in 1923 the South's part was 842,489 tons, as compared to 837,764 tons for the North and West. But the Tennessee Copper Company, as previously stated, is the dominant producer now, rather than the fertilizer manufacturing plants.

Economy of Mixed Fertilizers

While fertilizer manufacturers have mined rock phosphate, produced sulphuric acid and turned out acid phosphate, the largest part of the business has been the combination of different plant-food materials to make mixed or complete fertilizers. Phosphoric acid, nitrogen and potash combined in ratios which experiments reveal are the best for each crop and each soil type is the fundamental purpose of the fertilizer industry. Other nations do not produce mixed fertilizers, but sell separate materials to farmers. Why is this practice not followed in this country?

Fertilizer manufacturers with their chemists, technical skill and efficient machinery are able to draw upon many sources of fertilizing material that otherwise might never have been used. As a consequence, competition is created and the general level of prices of fertilizers has been held down. This favorable condition would never have developed had the fertilizer manufacturers contented themselves with producing different materials and turning them over to the farmer to mix.

The farmer can mix only a few fertilizer materials with any degree of success. Left to do his own mixing he would be at the mercy of the producers of the limited number of materials, with the certainty that competition would be restricted and prices would be higher than they now are. In a word, the production of complete fertilizers is an efficient and economical step in evolution of an industry and the best means for serving the consumer.

Crop Returns and Fertilizer Usage

That the prosperity of agriculture in the South is largely dependent upon the use of fertilizers is very well known. Southern soils are responsive; they yield up their plant food generously; they give large returns from applied fertilizers. But their efficiency and generosity have caused them to give up their natural fertility until they are not generously stocked with plant food; hence the necessity for applying fertilizers. Vast acreage of land now yielding large and profitable crops would never have been used for agricultural purposes at all except for fertilizers, and much of the Southern lands that originally contained a fair amount of fertility would have been exhausted and abandoned had not the discovery of commercial fertilizers come to their relief.

The development of the fertilizer industry in this country came at an opportune time when long cultivated soils were becoming unprofitable through exhaustion of plant food; came to replenish the soils store so successfully that Southern Agriculture reached its greatest heights of prosperity through the stimulus of commercial plant food.

The largest returns from improved acres of land in each county of the cotton-growing states of the Southeast are from areas receiving the most fertilizers.

Methods of Selling

The fertilizing manufacturing industry has developed its selling side to reach the individual consumer to a greater degree than manufacturers in general. In some regions the selling machinery is operating to deal directly with the consumer, but the general plan is to trade with the local dealer in every town.

Another feature that has characterized the fertilizer industry, that does not belong to most manufacturing in general, is the extent to which credit is accorded. The note of a local dealer, reinforced with crop mortgages of the farmer, has constituted the security on which fertilizers have been sold on credit. Previous to the deflation period as much as 85 per cent of fertilizers were sold in this way, the notes being due when the crops were gathered in the fall.

In times of security the liberal extension of credit developed the greatest amount of sales and the greatest prosperity for the fertilizer manufacturer, but in times of adversity the fertilizer manufacturer suffered heavy losses.

The most lavish extension of credit was practiced just previous to the deflation period. The cotton farmer had prospered beyond his dreams. He was "good pay." Hence the fertilizer manufacturers were lenient even to recklessness in extending credit.

Then when the price of cotton was highest, the future most promising, and the fertilizer manufacturers had extended the greatest amount of credit in their history, the deflation fell like a bolt from the blue. Then the weakness of the credit system was revealed in all of its destructiveness. Large surpluses that manufacturers had piled up in years past were swept away and in their place were yawning deficits.

To appreciate how quickly the fertilizer industry could suffer this heavy loss it must be observed that to produce the fertilizers required during a season requires enormous sums of borrowed money. It is an expensive business. Thus when any considerable number of farmers fail to pay their accounts the manufacturers are unable to pay the borrowed capital.

The blow that came with the deflation has caused the fertilizer industry to greatly reduce its credit sales, and since 1920 transactions have been largely for cash.

Whereas the fertilizer manufacturer had been accustomed to go to New York, borrow heavily, and thus reinforced extend credit to the farmer, the burden of credit extension has shifted from fertilizer manufacturer to the local banks and merchants. There is a strong conviction now existing that the burden of credit should rest on local shoulders, and that there is no obligation of the industry to act both as banker and manufacturer.

Cash has, therefore, largely superseded credit, and liberal cash discounts have been offered to encourage with cheapness what in the past has been encouraged with credit.

Era of Consolidation

The "big six" has come to designate six of the largest fertilizer companies in the United States. The others are spoken of as "independent." The era of consolidation made rapid progress in the first decade of the present century. Companies spread from Maine to the tip of Florida. They were the largest industries of the kind in the world. They reached out to control supplies of nitrate of soda in Chile, potash in Germany, rock phosphate deposits in various places in this country, and branched out into other chemical industries.

In recent years movements toward consolidation have ceased. One of the "big six," lingering for a while, finally succumbed to the blow received at the deflation period, but it is operating under a receiver and there are favorable indications for its reorganization.

The deflation put out of business a large number of "dry mixers," small plants with local distribution. In 1923 there were, in fact, fewer fertilizer plants operating than for a long time. But there are indications of the reappearance of the "dry mixers."

The demand for fertilizers is steadily increasing. No manufacturing industry is so certain of a steadily growing demand. It is an industry of tremendous economic importance to the nation, supplying, as it does, plant food when the natural fertility of the soil wanes. There is unquestionably a bright future ahead.

Just now the industry is readjusting itself, trying to get on a better basis of doing business as the result of its adversities. Naturally this is a period of some hesitation and confusion. Demoralization of prices, bringing about losses rather than profits for the past three years, may be charged up to this confusion of readjustments.

The transition to a new and better basis is, however, coming about and a better day is in prospect.

Vegetable Oil Industry of the South—Cottonseed, Peanut and Soy Bean

By Charles A. Whittle, Atlanta, Ga.

The manufacture of Southern cottonseed into oil, meal, hulls and linters gained commercial importance in 1880, and has since that time grown to be one of the great industries of the country.

The rise of the cottonseed industry is one of the romances of Southern enterprise. For a long time seeds of the cotton plant had very little value. They were in the way and were often burned as a nuisance. Now over 700 mills manufacture from the seed products valued at $581,000,000.

The practice of extracting oil from cottonseed was practiced in a crude way in England and France long before it became an established business in this country. But it was nearly half a century after the first attempts were made here before oil became an article of much commercial importance.

An old record tells of oil being extracted from cottonseed in 1804 in Philadelphia, Pa., and it was declared to be superior to linseed oil for burning in lamps. This initial production of cottonseed oil is credited to Dr. George Hunter, a chemist.

Another record tells of Dr. Benjamin Waring, Columbia, S. C., producing in 1826 from a grist mill, paper mill and oil mill combined "very good" cottonseed oil.

The chief difficulty in expressing the oil of the seed in the early days was the presence of hulls and linters, which absorbed much of the oil. This difficulty seems to have been successfully attacked by Follett and Smith of Petersburg, Va., who invented a means for removing the hulls, an account of which appeared on August 29, 1829, in Niles Weekly Register.

With the same objective in view a huller was patented by Lancelot Johnson, Madison, Ga., an elaborate account of which appeared in the Southern Banner July 3, 1833, under the name of Judge Clayton, Athens, Ga.

It is certain from statements in a New Orleans paper that there was an oil mill in operation at Natchez, Miss., in 1834, and also one at Mobile in 1835. A mill was in existence in New Orleans in 1847, which, however, did not succeed, but William Wilber, who was interested in the undertaking, invented a huller in 1855, introduced it, erecting the same year, in association with Paul Aldige, another oil mill in New Orleans.

An oil mill was reported in existence in Georgia in 1832. But these and other early attempts were efforts of pioneers whose vision reached beyond their day.

When the Civil War broke out the possibilities of the cotton oil industry were just beginning to be realized. It has been claimed that if the South had developed the cottonseed industry earlier, there would have been a source of food available to the Confederacy that would have kept it from defeat. The first post-war undertaking was at Columbia, S. C. There in 1866 Gen. E. P. Alexander erected an oil mill. So that with Dr. Waring's oil production in 1826 and General Alexander's plant in 1866 Columbia, S. C., may properly claim to be the birthplace of the cottonseed oil industry.

The development of the infant industry was beset with many ills. Reverses were frequent through the eighties. Consolidation and reorganization took place.

The pioneers who shaped the course of the cottonseed oil industry in the eighties were J. J. McCann, J. F. and M. J. O'Shaughnessy of Tennessee; Robert Gibson and J. W. Allison, Texas; Geo. A. Morrison and R. F. Munro, New York; Moses Frank and A. E. Thornton, Georgia; E. M. Durham and J. O. Carpenter, Mississippi; A. D. Allen, Arkansas; T. R. Chaney, Connecticut; Geo. O. Baker, Alabama; D. A. Tompkins and Fred Oliver of Charlotte, and others.

It was in 1887 that the strong Southern Cotton Oil

Company came into the field, not only to crush seed but to refine oil and to convert it into several products. The genius of this company undoubtedly brought the cottonseed oil industry to its highest point of development. Those who took up the organization and prosecution of the great work of that company were Henry C. Butcher, Philadelphia, Pa.; Fred Oliver and D. A. Tompkins, Charlotte, N. C.; L. W. Haskell, Savannah, Ga.; C. Fitzsimons and J. S. Price, Columbia, S. C.; Henry Oliver, Atlanta; A. C. Landry, New Orleans; Alston Boyd, Memphis; J. J. Culbertson, Little Rock, Ark.; E. W. Thompson and J. W. Block, Montgomery, Ala., and W. G. Kay, Houston, Texas.

After the larger companies had blazed the way many smaller ones appeared, until in 1914 there were 872 plants producing cottonseed oil.

In consequence of the stress brought by the initial attack of the boll weevil and the deflation adversity of recent years the number of plants in operation in 1923 had fallen to 527.

A statistical story of the rise of this great Southern industry is herewith given:

The gray seed of the cotton plant, once so useless as to be spurned, has in time been revealed as a veritable box of blessings. The golden oil, the nutritious meal and hulls and the linters shaved from the seed are the primary issues of the miraculous seed.

The oil has been refined to epicurian perfection, and as an edible product vies with the best of olive oil. It constitutes an important part of oleomargerine—the purest of butter. It is changed by a simple chemical process to a most wholesome and superior hogless lard. It is a part of the best of soaps, contributing purity and cleanliness. It is even a part of my lady's perfume. It is, in fact, a desirable oil in scores of things in which oil is used.

When the oil has been forced from the seed, the meal that remains is high in feeding value, choice and cheapest source of protein, profitable to dairymen, valuable for all kinds of livestock.

Great quantities of cottonseed meal have been used as an ingredient of fertilizers. Its 7 or 8 per cent of nitrogen has provided that element of plant food for millions of tons of fertilizer. But cottonseed meal and other organic ammoniates are so desirable as feed, and the feed-

COTTONSEED OIL INDUSTRY, 1890-1919

Year	Number of establishments	Wage-earners	Capital	Wages	Value of product
1890	119	5,906	$12,808,906	$1,493,789	$19,335,947
1900	369	11,007	34,451,461	3,143,459	58,726,632
1905	715	15,539	73,771,407	4,837,694	96,407,621
1909	810	17,071	91,086,000	5,835,000	147,808,000
1914	872	21,810	118,073,075	8,489,692	212,127,024
1919	711	26,766	203,457,371	20,615,193	581,244,798

COTTONSEED CRUSHED AND OIL MILL PRODUCTION

Year	Seed crushed Tons	Meal Tons	Oil Gals.	Hulls Tons	Linters Bales
1875	84,000	30,000	3,370,000	.....	.....
1880	235,000	82,000	9,420,000	.....	.....
1885	499,000	174,000	19,950,000	.....	.....
1890	874,000	306,000	34,950,000	.....	.....
1895	1,677,000	587,000	67,090,000	.....	.....
1900	2,479,000	884,000	93,330,000	1,169,000	114,544
1901	2,415,000	845,000	96,610,000	1,139,000	111,096
1902	3,154,000	1,125,000	118,610,000	1,487,000	145,103
1903	3,269,000	1,165,000	122,910,000	1,541,000	150,366
1904	3,241,000	1,156,000	121,880,000	1,528,000	194,486
1905	3,345,000	1,360,000	133,820,000	1,213,000	235,586
1906	3,131,000	1,272,000	125,700,000	1,135,000	219,397
1907	3,844,000	1,563,000	153,760,000	1,393,000	307,518
1908	2,565,000	1,043,000	103,050,000	927,000	256,487
1909	3,670,000	1,492,000	146,790,000	1,330,000	330,277
1910	3,269,000	1,326,000	131,000,000	1,189,000	296,640
1911	4,106,000	1,792,000	167,970,000	1,375,000	379,576
1912	4,921,073	2,151,000	201,650,000	1,642,000	533,099
1913	4,579,508	1,999,000	185,750,000	1,540,000	583,091
1914	4,847,628	2,220,000	193,330,000	1,400,000	660,087
1915	5,779,665	2,648,000	229,260,000	1,677,000	820,274
1916	4,202,313	1,923,000	167,110,000	1,220,000	889,577
1917	4,479,176	2,225,000	187,688,000	969,000	1,273,345
1918	4,251,680	2,068,000	174,996,000	996,000	1,080,802
1919	4,478,508	2,170,000	176,711,000	1,137,000	889,500
1920	4,012,704	1,817,000	161,529,000	1,143,000	584,146
1921	4,069,166	1,786,000	174,558,000	1,256,000	422,226
1922	3,007,717	1,354,604	124,063,298	936,990	383,547
1923	3,241,557	1,487,067	133,722,995	943,773	584,177

ers can afford to pay so much more than the fertilizer manufacturer, the tendency of cottonseed meal now is away from fertilizers.

The hulls of the seed, like the meal, find their chief demand in the feed trade. For this they are valuable, but they are not as high in feeding value as cottonseed meal. As a high-grade roughage, however, the hulls give excellent results.

Before the fuzzy seeds are crushed they are, as a rule, put through a delinter, which shaves or chips off the short lint or linters.

The greatest demand ever created for linters was during the World War, when a ready market took all that could be produced for "gun cotton." At other times the demand for linters is chiefly from makers of cushions, quilts and mattresses, but in recent times there has also been an increasing demand in Europe for longer cuts of linters in the manufacture of shoddy.

What an array of ministrations to man have issued from the lowly cottonseed! It is truly a box of blessings.

Allied With Fertilizer Industry

Chiefly because the oil mills were producing cottonseed meal, a material formerly more largely used than now in the manufacture of fertilizers, the cottonseed oil mills of the Southeast also became so many fertilizer manufacturing and mixing plants. The oil millers were also encouraged to enter the fertilizer business by the opportunity it afforded for extending the operating period of their plants and for thus reducing the overhead charges against the output.

Both the oil production and the fertilizer business, however, called for seasonal use of large amounts of borrowed capital. With the adversity attending the deflation and the reduction in volume of oil business due to the invasion of the boll weevil, the financial strain was too great for some of the dual-purpose manufacturing plants, accounting for the downfall of the largest of all the companies, the retirement of the second largest and the failure of several small companies.

World Competition

When cotton oil production first got under way three-fourths of the oil was exported. Refined and compounded, much of the oil came back to this country and was sold at a favorable price.

In recent years nearly all of the oil has come to be refined and manufactured in this country largely to supply a domestic demand.

For years the pressure of the Orient upon the vegetable oil industry of this country has been felt. Oil mills sprang up on the Pacific Coast, far from the cotton fields. The reason was peanuts, peanut oil, soy beans and soy bean oil from China and Japan, and copra from the Pacific islands. Of these, peanuts were chief in importance. Domestic peanut production of this country waned under the Oriental invasion until the tariff was imposed, since when there has been a gradual recovery of the peanut output of the United States.

But in discouraging the Oriental from entering our ports, it is claimed they have turned to Europe and have taken away the greater part of the remaining oil export business of the United States. However, it is also claimed that the development of the vegetable oil industry by the great centers of Marseilles, France, and Hull, England, was stimulating African, Asiatic and European sources of vegetable oils to an extent that was bound in time to prove a serious competitor of United States oils in Europe. As for the cooking oils made by the Wesson process and other products manufactured from oil, the United States will find no serious hindrance to export business.

Oil Mills Widely Distributed

The oil mill has been taken to the cotton fields, rather than the seed to some oil-producing center. In this the industry has acted wisely. It has allowed the most economical processes of assembling seed from the farmers and distributing meal and hulls to the farmers in turn. In many places it is a custom for the farmer to haul in his seed to the cotton oil mill and take meal in exchange.

This proximity to the cotton farmer and to the oil mill is an advantage in conducting the fertilizer business in which many of them engage. Consequently, there is no Hull, England, or Marseilles, France, in the vegetable oil business of the South.

Passing through the South the presence here and there of the cotton oil mill is sensed in the rich, nutty flavor of the steamed seed undergoing the processes of the extraction of their oil.

Oil Crushers' Organizations

The fact that oil mills are scattered increases the importance of association activity. Each of the states is either organized into an association of its own or there is an association of two states combined, over all of which there is the Interstate Cottonseed Crushers' Association.

Paid secretaries devote their time to each association in bringing to all members the information needed to keep the individual manufacturer abreast and in touch with all essential information. To the interstate organization belongs the duty of general publicity in promoting the use of the mill products and the duty of shaping general policies for the guidance of the industry.

Future of the Industry

Between 4,000,000 and 5,000,000 tons of cottonseed will be crushed each year. Perhaps this tonnage may increase slowly. In recent years this available business has not been handled profitably in many instances. Some have failed. Fewer remain to handle the crush, which reduction of competitors in itself should brighten the prospect.

A weakness of the oil industry has been a lack of material on which to operate regularly, due to excess producing capacity. Whether the unused time shall be given to manufacturing and distributing fertilizers or to some other project is not our purpose to discuss here, further than to say that there are opportunities for materially increasing the vegetable oil output by encouraging the production of peanuts and soy beans in the cotton belt. It has also been demonstrated that there are possibilities of producing tung oil from tung oil nuts that will grow successfully in the lower South. This oil is imported now.

This is an era of vegetable oil. It is finding use in increasing numbers of avenues. As a source of fats for human food, vegetable oils are becoming increasingly important, because they are both dietetically excellent and economical.

Chief among the vegetable oils is that obtained from the cottonseed, of which the Southern states control the greatest source. Likewise, the Southern states may develop the peanut and soy bean to a dominating position in the vegetable oil world. Untoward incidents have hindered the vegetable oil industry in recent years, but the outlook is clearing up, and there seems good reason to believe that the vegetable oil industry of the South will gain strength and grow in magnitude and achievement as time advances.

Tobacco Oldest and Most American of Our Industries

One-Third of World's Tobacco Grown in the South

By C. L. Franklin, Editor Tobacco, New York, N. Y.

NEITHER statistician nor historian can set forth in full the influence of tobacco on the progress of the country. No records show when or where tobacco culture originated. In America the use of tobacco is prehistoric. Tobacco represents the oldest and most American industry in the United States. Chant the praises of the tobacco plant as it appears through the vista of years! Salute the threefold symbol of peace, thrift and achievement! Note well how tobacco has contributed to the development of that part of our country usually known as the South.

At the first permanent English settlement in this country, export tobacco trade had its historic beginning. John Rolfe, husband of Pocahontas and secretary of the colony, was the earliest exporter of tobacco from Virginia to England. From Jamestown, in 1618, Rolfe and his friends sent a shipment of ten tons of tobacco to London. For the shipment they obtained the equivalent of 54¾ cent per pound. The following year they shipped twenty tons and received, per pound, the same price, proving that there was real money in the export tobacco business. In 1629 Virginia exported 500,000 pounds of tobacco. The price then obtainable for a pound of sound tobacco was approximately "a shilling." In 1639, when 1,500,000 pounds were exported, the price per pound went down to three pence, or six and eight-hundredths cents in our currency. From 1641 to 1774 the development of export tobacco business was shown as follows: In 1641, 1,300,000 pounds were exported; 1664, 23,750,000 pounds; 1668, 19,147,000 pounds; 1691, 36,000,000 pounds; 1706, 28,858,000 pounds; 1745; 38,230,000 pounds; 1753, 48,263,000 pounds; 1765, 75,482,000 pounds; 1774, 101,828,000 pounds.

During the period covered the export price of tobacco per pound usually remained around three cents. In 1703 the exporters got scarcely more than two cents a pound for their tobacco. The low mark was touched in 1730, when the export price was only 1½ cents per pound.

After the Revolutionary War export trade came back stronger than before. In 1790 the United States exported 130,000,000 pounds of tobacco at a price of three and four-tenths cents per pound.

Originally tobacco was put up for the market in rolls of 100 pounds. Then the cask or hogshead was introduced. These contained anywhere from 500 to 1500 pounds. Tobacco was brought to the warehouse, where it was weighed, inspected and graded by the Government official, and the planter was given a tobacco receipt, or a "tobacco note," as it was called. The planter either sold this note to a tobacco merchant or exchanged it for other commodities. These tobacco notes were legal tender and were honored freely anywhere in the colonies.

At the end of the colonial period tobacco had reached the high-water mark of its importance. In 1790 it ranked second in value on the list of exports and amounted to $4,349,567, or 21½ per cent of the colonial exports ($20,000,000). It was exceeded only by flour, which was valued at $4,591,293, and in 1791 it exceeded flour as an export crop. Over one-half of the total Southern population of 1790 was either engaged in or depended on the cultivation of tobacco.

Although in 1800 tobacco was still the leading Southern product, it was rapidly surrendering supremacy to cotton. The effects of the embargo and the War of 1812 were disastrous to the tobacco planters. In 1806 our tobacco exports were 83,186 hogsheads; in 1808 they fell to 9576 hogsheads. In 1810 84,134 hogsheads were exported, but in 1814 only 3125 hogsheads. The direct effect, however, was even more significant. When our European markets were cut off, the production of leaf tobacco was encouraged on the Continent and supplies were brought from Cuba, Columbia and Java. The fiscal policy of European nations also checked the cultivation of tobacco.

England Imposed Heavy Duty on Tobacco

To recoup themselves for the losses incurred by the Napoleonic wars, high import taxes were levied on all articles of luxury, including tobacco. England raised her tax from 28 cents a pound to 75 cents a pound.

From 1790 to 1840 the industry was stationary. It was not until 1840 that our tobacco exports equaled those of 1790. Improvements, however, in the curing of tobacco gave the industry new life. Prior to 1812 most tobacco was cured in the open air. Subsequently wood fires were used for curing, and in 1837 charcoal was introduced. The "yellow bright," a popular leaf, was made possible by the new methods. In 1852 a lemon-colored leaf was grown for the first time in Caswell county, North Carolina, and became very popular both at home and abroad. This new type created new markets in Europe. From North Carolina this new leaf was carried into Kentucky, Ohio and Tennessee. In a single decade, from 1850 to 1860, tobacco production increased 115 per cent.

The soil in the older states was becoming impoverished, due to the old methods of cultivation, the single crop methods, with no fertilizer and no rotation of crops, and the newer states were making greater progress in tobacco culture. In 1859 the production of Kentucky, Ohio and Tennessee, states which did not figure at all in 1790, was 176,707,518 pounds; that of Virginia, Maryland and North Carolina, 195,232,527 pounds, and much of the latter was cultivated on virgin soil opened up since 1850 in North Carolina.

One-half of the total crop was exported in 1860, England still being the chief market, though Germany was a close second. The leaf was used for pipe smoking, chewing and snuff.

Tobacco was an important source of income, and materially affected not only the well-being of the people directly depending on this crop but state economies. In Virginia, Maryland and North Carolina during the colonial days, and later in Kentucky and Tennessee, tobacco was a barometer which measured the prosperity of the people. In 1790 exports reached $4,349,569; in 1840, $9,883,957; and in 1860, $15,906,547. The per capita wealth in the South in 1790 was much greater than that of the North, being, for the free population, $137.98 for New England, $145.41 for Middle states, and $217.07 for the Southern

states. The South was not only the largest tobacco-producing section of this country but of the world.

During the Civil War, and for a time afterward, export tobacco trade was reduced practically to insignificance. But the tobacco industry, re-established, developed and persistently fostered, became very important in promoting the prosperity of the new South. In various districts tobacco, as of yore, was the dependable money crop. Though the growers did not obtain high prices for many years, producing tobacco seemed to offer the surest reward for tilling the soil. Acreage was enlarged. Production increased. Farmers bestowed greater care on their tobacco fields. Cultivation was done more diligently and intelligently. Harvesting and curing no longer were regarded as work that could be performed in a haphazard way. Gradually tobacco culture was evolved into scientific farming. In their perennial attempts to improve and augment production the growers were encouraged and aided, first, by warehousemen, who bought tobacco for export, and later by the manufacturers, who originated, introduced and developed the tremendously popular brands of smoking tobacco and cigarettes. The phenomenal rise and enlargement of the cigarette industry is associated inseparably with the growth of tobacco export trade.

George Washington A Tobacco Exporter

Another thing that assisted greatly in the extension and augmentation of American export trade was, and is, the proven reliability of packers and shippers. Whether individuals, partnerships or incorporated companies, most of the exporters emulated the example of George Washington, who, in his day, was America's foremost tobacco planter and exporter. Buyers in Europe could and did put implicit trust in statements that Washington made. Tobacco that Washington shipped invariably was found to be exactly as represented. Throughout the South today the principal exporters fully deserve and justify the high confidence placed in them by foreign buyers. The integrity, judgment, experience, technical knowledge and trustworthiness of important exporters are so well known that European and other purchasers abroad have no hesitation in transacting business entirely by cable.

More emphatically than ever before, the World War demonstrated how necessary tobacco is. Following the startling proofs of the indispensability of tobacco came unprecedented generosity in the distribution of cigarettes. That pipes, cigarettes and cigars might alleviate the sufferings of the wounded and add to the comfort and morale of our fighting men in France, the United States Government bought smoking tobacco and cigarettes in quantities that dwarfed all previous purchases. Also, for the same purpose, enormous amounts of smoking tobacco and cigarettes were shipped across the Atlantic by the American Red Cross and other agencies. Certainly such shipments helped to popularize American tobacco in Europe.

Except Belgium, the biggest part of which then was in the grip of Germany, all the Allied countries during the war annually bought from the United States more than their usual quota of leaf tobacco. For years hereinafter named United States exports of leaf tobacco were: 1913, 441,080,000 pounds; 1914, 345,922,000 pounds; 1915, 428,297,000 pounds; 1916, 477,908,000 pounds; 1917, 251,252,000 pounds; 1918, 401,292,000 pounds.

Relative to tobacco exports, during the war, among the things to be taken into consideration were the high cost of handling, delayed and congested transportation, a shortage of labor, difficult shipping and extraordinary risks. Also, it should be remembered that trade with European neutrals was restricted for a time.

Though United States leaf tobacco exports for 1922, amounting to 430,907,908 pounds, valued at $145,984,982, were less in volume than the exports during the pre-war year of 1913, the figures for 1923 prove a substantial increase. Not including stems and trimmings, this country, in 1923, exported 474,500,139 pounds of leaf tobacco, having the value of $152,303,061.

American Tobacco Statistics

Year (Cal.)	Crop yield		Exports, domestic leaf, unmanufactured		Imports	
	Pounds	Value	Pounds	Value	Unmanufactured Pounds	Manufactured Value
1900	814,345,341	$53,661,132	315,787,782	$27,656,475	19,198,363	$825,198
1901	818,953,373	58,283,108	301,007,365	27,103,996	23,347,471	799,630
1902	821,823,963	57,563,510	368,184,084	35,250,893	28,086,233	971,887
1903	815,972,425	55,514,627	311,971,831	29,640,812	27,933,496	1,038,054
1904	720,804,449	58,385,160	334,302,091	29,800,816	31,238,590	1,166,776
1905	779,384,945	66,247,720	312,227,202	28,808,376	37,383,953	1,133,876
1906	682,428,530	68,232,647	340,742,864	33,377,398	40,483,895	1,146,218
1907	698,126,000	71,411,000	330,812,658	34,727,157	35,833,492	1,086,170
1908	718,061,000	74,130,185	287,900,946	30,902,900	38,561,206	1,026,723
1909	1,055,764,806	104,302,856	357,196,074	38,115,386	38,657,869	3,113,458
1910	1,103,415,000	102,142,000	355,327,072	39,255,320	45,433,154	2,033,329
1911	905,709,000	85,210,000	379,845,320	43,251,857	54,740,380	1,587,971
1912	962,855,000	104,063,000	418,796,906	49,353,595	67,977,118	2,392,089
1913	953,734,000	122,481,000	449,749,982	53,963,670	61,174,751	1,625,568
1914	1,034,679,000	101,411,000	348,346,091	44,493,829	45,764,728	1,511,249
1915	1,062,237,000	96,281,000	441,569,581	53,163,595	48,013,335	1,698,736
1916	1,153,278,000	169,008,000	411,598,860	59,954,307	46,136,347	3,063,858
1917	1,249,276,000	300,449,000	289,170,686	69,674,731	79,367,563	4,523,117
1918	1,439,071,000	402,264,000	625,072,853	189,894,417	83,951,103	4,815,978
1919	1,372,993,261	541,547,000	632,795,586	271,946,489	94,005,182	4,664,876
1920	1,582,225,000	335,675,000	496,878,830	237,051,083	58,923,217	4,988,727
1921	1,075,418,000	213,846,000	451,888,436	156,772,566	65,225,437	2,172,436
1922	1,246,837,000	289,248,000	430,907,978	145,984,982	75,783,440	4,673,247
1923	1,474,786,000	298,936,000	474,500,139	152,303,051	74,300,000	4,481,000

The South Raises Nearly One-Third of the World's Tobacco

The world's tobacco production, chiefly contributed by

eleven countries, is nearly 4,000,000,000 pounds. America contributes about 35 per cent of this per annum, the bulk of it in the South. Statistics indicate that while the quantity of tobacco produced since 1910 has not increased as rapidly as conditions appeared to warrant, the cheapening of money made the value of the 1922 and 1923 crops appear to be nearly three times as valuable as the 1910 crop. Export returns, however, indicate a very healthy increase in domestic unmanufactured tobacco. The increased production of the European factories consuming our raw tobaccos, chiefly those in Great Britain, have called for increased exports. In 1910 unmanufactured domestic leaf exported amounted to 355,327,072 pounds, valued at $39,255,320, as compared with $430,907,978 pounds, valued at $145,984,982 in 1922. Both quantities and values show increases in the twelve years. In that period the greatest crop yield was attained in 1920, when the returns showed 1,582,225,000 pounds, valued at $335,675,000. The greatest exports were in 1919, following the settlement of the war, when 632,795,586 pounds of unmanufactured domestic leaf, valued at $271,946,489, were exported. That year also saw record figures made in our tobacco imports, the figures being, imports of unmanufactured tobaccos 94,005,182 pounds, and of manufactured tobaccos 4,664,876 pounds, as compared with an average of about 50,000,000 pounds and 4,000,000 pounds, respectively.

All sorts and conditions of men acknowledge the excellence of pipe and cigarette tobacco grown in the South. In tremendous demand, for home use and for export, tobacco long has been the "money crop" in extensive territory. In Virginia, the Carolinas, Georgia, Kentucky, Tennessee, West Virginia and Maryland multiplied thousands of farmers are financed principally by what tobacco they take to market. On the yield of tobacco and on the price of tobacco depend the prosperity of millions of people. In the part of the United States that is called Dixie, tobacco planting has been a leading industry for centuries. Even in infancy of the first settlement at Jamestown tobacco culture became important. In various ways in American history tobacco achieves prominence.

How the South is benefited by tobacco cannot be stated entirely in dollars, nor will the acreage annually allotted to the herb be fully explanatory of the good that tobacco does to the sections where it is grown.

Tobacco Growing Encourages Intelligent Farming

Though tobacco is an exhaustive crop, the law of compensation applies. Though tobacco verily consumes the fertility of the soil, it may add to the wealth of a district by inducing more scientific farming. Though a tobacco crop demands of the grower more skill, zeal, intelligence, labor and care, it develops his ability and gives him a better understanding of agricultural problems. It urges him to be industrious and thrifty. It causes him to observe. He is compelled to take thought. He has to do his work at the proper time. He learns that danger and loss are associated with procrastination or delay. He perceives the value of extra effort. He is encouraged to exert himself to obtain a fine yield. No slothful incompetent is likely to achieve real success in tobacco culture. But a diligent, painstaking, intelligent tobacco grower may become a man of mark in his community.

FIELD OF BRIGHT LEAF TOBACCO—THE SOUTH PRODUCES NEARLY ALL OF THIS CROP

The improvement of agricultural conditions in many sections of Dixie is largely attributable to tobacco. Men identified with the tobacco industry have done, and are doing much for the general welfare. Where fortune smiles on the tobacco planter, there is progress. When tobacco growers are prosperous, other people are enabled to make money. The "Old Dominion" and adjoining states have reason zealously to regard the interests of tobacco growers.

Places where tobacco is marketed have increased prosperity. A town that is shown to be a desirable tobacco market eventually becomes a city. An agricultural district obtaining recognition as a producer of fine tobacco is sure to see a rise of land values.

Of the South Atlantic states, Virginia, in tobacco production, is second only to North Carolina in total acreage and gross value of the crop. The census of 1920 reports 225,504 acres from which there was harvested 102,391,226 pounds of tobacco, or an average of 455 pounds per acre. The valuation of the crop was $48,123,877, or an average of $213.50 an acre. The crop was grown on 52,409 farms, which is 28.1 per cent of the total number of farms of the state. The average acreage per farm was 4.3.

The value of the tobacco crop of Virginia can be more readily seen by a comparison with the other crops of the state. As stated above, tobacco produced a gross value of only $20,000 less than the combined gross valuation of the oats, wheat, rye, peanuts and cotton crops. To produce this value the tobacco occupied only 225,504 acres, as compared to the 1,363,560 acres which these other crops occupied. In other words, on one-sixth of the acreage tobacco produced practically as much wealth as the oats, wheat, rye, peanuts and cotton.

The money-producing power per acre is the chief factor for the creditable showing which tobacco as a crop makes. The value of tobacco per acre was $213.50, as compared to $15.50 per acre for oats, $43.40 for corn, $26.90 for wheat, $14.40 for rye, $99 for peanuts, $31.50 for annual legumes cut for hay, and $112.40 for cotton.

North Carolina's 1922 tobacco crop alone was worth more than the total value of all crops and livestock in 1922 in any one of the following states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Wyoming, New Mexico, Arizona, Utah or Nevada.

More than statistics are required to tell in full how advantageous the tobacco-growing regions are to the South.

The importance of tobacco to Dixie is conceded. But not until one commences to think and figure does he get an idea of the immensity of the tobacco business. Financially and otherwise, how far-reaching is the influence that tobacco exerts!

With the indicated acreage of each the states largely identified with the production of cigarette, pipe, chewing, snuff and "export" tobacco are: North Carolina, 554,000 acres; Kentucky, 550,000 acres, Virginia, 230,000 acres; Tennessee, 140,000 acres; South Carolina, 135,000 acres; Georgia, 50,000 acres; and Maryland, 29,000 acres. In Missouri upwards of 5000 acres, West Virginia 9000 acres, Florida 4000 acres, and Alabama 2600 acres. In the other Southern states tobacco cultivation is unimportant.

Who can tell how many people, directly or indirectly, are dependent on the tobacco industry? What would conditions be in the Carolinas, Kentucky, Virginia and Tennessee if tobacco growing and manufacturing should cease? Imagine what would happen if the use of tobacco should be prohibited.

The Commercial Value of Brands and Trade-Marks and Honor in the Tobacco Trade

Long established, ever having a deservedly good reputation, the tobacco industry in Dixie assuredly is dependable. Without honesty there can be no enduring success in the tobacco business. In other field of endeavor inferior products are not classified so rigidly or rejected so quickly. Tobacco is best commended by evident merit. To acquire standing, to gain monetary rewards, to obtain prestige or to be accredited at all, farmers, warehousemen and manufacturers have to prove their reliability. If they can't make a favorable showing, usually they go rather swiftly into discard. A grower who is careless, a warehouseman who is undependable, a manufacturer who practices deception, a dealer not worthy to be trusted—men in these classes soon fade out of the picture.

Almost without exception the great tobacco enterprises were developed gradually from small beginnings. Business has been built up substantially because the builders had ability, foresight and persistence. In their undertakings they inspired respect and commanded confidence. Integrity is the backbone of the tobacco industry in the South today.

Reputations are more important than accumulated fortunes. Aggregations of factories do not have the active value that attaches to some brands. Dependability and popularity of products are preferred assets of the more successful manufacturers however great the outstanding evidence of their wealth may be.

Of all the commodities manufactured in the world, no other articles have brands so valuable as certain brands of cigarettes and smoking tobacco. The stupendous development of cigarette manufacturing in recent years offers amazing proof of the desirability of brands as property.

History of Two Tobacco Interests as Typical of the South's Tobacco Trade

Borrowed from a mustard bottle, the Bull Durham brand stands for the first great industry established in the "new South." The quick growth of favor accorded Durham smoking tobacco was an aftermath of the war. Shortly after Lee surrendered to Grant at Appomattox, Johnson began to negotiate with Sherman for the surrender of the Confederate forces in North Carolina. A temporary suspension of hostilities was agreed upon; at Bennett's place the negotiations were carried on; between the opposing armies, three miles from the Bennett house, was Durham's station. On the poorly equipped railroad, merely a place where local trains stopped occasionally, Durham's station seemed to have scant importance then. The "station" had no buildings at all. In the immediate neighborhood the only industry of any pretensions was a small and somewhat primitive factory where James R. Green, from flue-cured material produced in the vicinity, made granulated smoking tobacco.

Because, late in 1864 and early in 1865, the depreciation of Confederate money greatly discouraged sales, the Green factory, the 1st of April, had on hand an abnormal stock of unsold tobacco. By the fortunes of war, placed between two armies, during an armistice, Green's supply of manufactured smoking tobacco most rapidly disappeared. As the Federal and Confederate lines approached, officious persons, unauthorized by Green, carried quantities of tobacco away to "places of safety." Johnson's skirmishers took some and Sherman's foragers got more. The factory was pillaged until the last bit of tobacco was gone. Soldiers not having a chance to "help themselves" at Green's factory bought tobacco wherever they could in the neighborhood. Though unwillingly he had supplied the tobacco, the proprietor of the factory received no part of the proceeds of such sales. Johnson surrendered, and Sherman's army moved north to be mustered out. And to Green, for a while, it appeared that his business had been hopelessly ruined.

Yet within a month commenced the transformation. Every mail brought letters from the North to the local postmaster, to the justice of peace, to the sheriff of the county and to Green. Many of these letters brought money; every one contained an inquiry about or a request for "the tobacco that was manufactured at Durham's station." Men who had campaigned in North Carolina with Sherman were "stuck on that tobacco"; they liked it so much that they wanted more right away. Hundreds and thousands of unsolicited orders, pouring in from the North, caused Green to get busy. With all possible speed he re-established his business. Honestly, painstakingly,

he manufactured granulated smoking tobacco, using the flue-cured local product and adhering to his old formula.

Green's packing for a time was neither uniform nor distinctive; to hold the tobacco sent to customers, near or far, "almost anything handy" was used; flour sacks, shot bags, paper wrappers, boxes, kegs and barrels were filled up and shipped away. Green's chief care was to keep up the quality of his product. Unbranded, unadvertised, except by those who used it, the smoking tobacco from Durham's station extended its fame. In a few months business increased to proportions greater than Green had "dreamed of" in the old days. But a beginning hardly had been made.

Seated at dinner with a friend one day in a little country restaurant, Green was explaining his sudden prosperity and showing how well he was doing. The friend, however, refused to be persuaded that Green was making proper preparations for the future. Convincingly he pointed out to Green that, to obtain the best results from distribution, a manufactured product should be identified and authenticated.

"How?"

"Usually the outward attestations are a brand or trade-mark and a particular style of packing."

"You think I ought to have a trade-mark?"

"You'll lose trade if you don't brand your goods. You risk your reputation and expose your business to financial injury by not having a trade-mark and uniform packages."

"But I haven't considered the matter yet. Can you suggest something appropriate?"

"Why" —— Green's friend paused and looked across the table. By chance his glance rested on the mustard bottle. The mustard was a product of the locality. On the label affixed to the bottle, under the word "Durham," a bull was crudely depicted. "Wouldn't that suit you? The association of 'Bull' and 'Durham' seems to be a rather good idea."

Green, after looking at the label on the mustard bottle for a while, accepted the suggestion. "If it's all right," he said, "I'll use it."

The registration of the Bull brand by James R. Green, on May 2, 1866, was epoch-making in the history of smoking tobacco.

Durham, a whistling station when the brand was started, has grown to be one of North Carolina's more important cities. And its popular insignia, everywhere visible, is the bull. Rightfully, too, for the substantial upbuilding of the municipality, to a large extent, is due to the world-wide distribution of the smoking tobacco that made Durham famous. From the insignificance of Durham's station in 1865 to the importance of the city of Durham today is a tremendous step upward. But hardly will it serve to illustrate how stupendously the sales of Bull Durham have increased. Almost a million bags for every day in the year, annual sales of over 352,000,000 sacks of Genuine Bull Durham smoking tobacco were recorded in 1914.

During the Great War, while the Government was taking the entire output of the great factory, production amounted to 32,000,000 sacks a month. This year, the demand for Bull Durham being bigger and more urgent than ever before, a corresponding output may be predicted.

But the average mind hardly can measure the immensity of production suggested by 384,000,000 sacks, the output obtained during a year of the war.

Take, for illustration, the smallest item of material used in packing, the string; the special cotton twine used to tie 384,000,000 tobacco sacks would encircle the earth at the equator three times and then leave enough to stretch from Ireland to Honolulu and back again. The string utilized in tying Bull Durham tobacco bags in the past three years would more than reach from the earth to the moon.

South Largest Producer of Cigarettes in World

Beyond doubt or question, the gigantic plant of the R. J. Reynolds Tobacco Co., at Winston-Salem, N. C., is the world's largest producer of cigarettes.

Yet notably bigger is the widespread, incessant and urgent demand for the cigarettes made there.

The enormous plant at Winston-Salem and associated activities aptly represent the steady development of well-laid plans.

Figuring on having a factory of his own, R. J. Reynolds looked around for a desirable location. He selected Winston-Salem. He realized the importance of transportation to a successful manufacturer. Conveniently situated in the famed "Piedmont tobacco belt," Winston-Salem had some railroad facilities in 1875 and the promise of more. R. J. Reynolds went there and erected a factory. The necessary outlay, including the cost of site, building and machinery, was $2400. After the factory was erected and paid for R. J. Reynolds had left $5100.

COMPOSITE PHOTOGRAPH OF THE R. J. REYNOLDS TOBACCO COMPANY'S FACTORIES

In the beginning the business was a partnership. R. J. Reynolds was the active man and his brother-in-law, Judge A. M. Lybrook of Stuart county, Virginia, was a silent partner. The name of the firm at that time was R. J. Reynolds & Co. During the first year the plant produced 150,000 pounds of manufactured tobacco, chiefly chewing.

In its first advertisement, published in the Iron Belt, in March, 1875, the R. J. Reynolds Tobacco Co. announced that it had "the largest and best tobacco factory in the South."

The partnership continued for a year. Judge Lybrook, making 25 per cent on his investment, sold his share in the business, and R. J. Reynolds was sole proprietor. Individually he conducted the enterprise until the R. J. Reynolds Tobacco Co. was organized in 1880.

The formation of the company didn't signify a change of management. For, in incorporating the growing business, R. J. Reynolds simply took his more important employes into the company with him. From the time of the incorporation the policy of "building up" firmly and faithfully has been examplified by the R. J. Reynolds Tobacco Co.

Though the name of Reynolds was associated with numerous and various brands of "smoking," and "chewing," tobacco during the time between 1875 and 1907, the substantial success attained was moderate indeed compared with developments made in recent years.

The facts given as to the history of the "Bull" Durham and the Reynolds Company are merely mentioned as typical of the character of the men who created the vast tobacco industry of the South. Many other concerns have had a history equally as romantic and successful.

The factories engaged in the manufacture of cigars, cigarettes, tobacco and snuff, and the number of wholesale dealers in the Dixie states, are shown in the following table:

TOBACCO FACTORIES IN SOUTHERN STATES

States	Cigars	Cigarettes	Tobacco and snuff	Total	Wholesale dealers
Virginia	58	8	33	99	364
North Carolina	29	6	24	59	540
South Carolina	10	..	1	11	68
Georgia	76	..	2	78	17
Florida	433	2	17	452	61
Tennessee	29	..	28	57	140

REVENUE DERIVED FROM TOBACCO AND TOBACCO PRODUCTS SINCE 1862

Year ending June 30	Total collections from all sources	Year ending June 30	Total collections from all sources
1863	$3,097,620.46	1894	$28,617,898.62
1864	8,592,098.98	1895	29,704,907.63
1865	11,401,373.10	1896	30,711,629.11
1866	16,531,007.83	1897	30,710,297.42
1867	19,765,148.41	1898	36,230,522.37
1868	18,730,095.32	1899	52,493,207.64
1869	23,430,707.57	1900	59,355,084.27
1870	31,350,707.18	1901	62,481,907.13
1871	33,578,907.88	1902	51,937,925.19
1872	33,736,170.52	1903	43,514,665.82
1873	34,386,303.09	1904	44,655,808.75
1874	33,242,875.62	1905	45,659,899.60
1875	37,303,461.88	1906	48,422,997.38
1876	39,795,339.91	1907	51,811,069.69
1877	41,106,546.92	1908	49,862,755.01
1878	40,091,754.67	1909	51,887,181.33
1879	40,135,002.65	1910	57,889,351.69
1880	38,870,140.08	1911	67,005,950.56
1881	42,854,991.31	1912	70,590,151.60
1882	47,391,988.91	1913	76,789,424.75
1883	42,104,249.79	1914	79,986,639.68
1884	26,062,399.98	1915	79,957,373.54
1885	26,407,088.48	1916	88,063,947.51
1886	27,907,362.53	1917	102,576,998.14
1887	30,108,067.13	1916	102,576,998.14
1888	30,662,431.52	1918	156,188,659.90
1889	31,866,860.42	1919	206,003,091.84
1890	33,958,991.06	1920	295,809,355.44
1891	32,796,270.97	1921	255,219,385.49
1892	31,000,493.07	1922	270,759,384.44
1893	31,889,711.74	1923	309,015,492.98

About each of the leaders in the trade a book well could be written. But to epitomize the story of the rise and expansion of the big tobacco companies is not easy. Even to give more than a vague idea is difficult, because much of the so-called "tobacco history" is a mixture of romance and finance. Pertaining to tobacco manufacturing, however, the bare truth is of greater interest than garnished fiction. From small and often-impeded beginnings, tremendous volumes of business was developed eventually in various ways. Many men and numerous corporations assisted conspicuously in increasing the importance of the tobacco industry in the South during the past half-century. Yet success in tobacco manufacturing largely is machine made.

In part, the present immensity of tobacco manufacturing is due to the utilization of improved machinery. Semi-automatic machinery enables manufacturers to accelerate production and obtain larger outputs the better to meet the ever-increasing demand. Maintenance of standards, the assurance of uniformity, also may be had by aid of mechanical appliances that are the latest manifestation of human ingenuity. Results in the tobacco industry show the ability of men and the achievement of machines. Not entirely by the bigness of an organization, but rather by the facility of its functioning in great emergencies as well as at ordinary times, is judged the personnel.

This is the day of efficiency and of specialization. The demand is for men who understand a particular line, men knowing thoroughly every detail of each duty they have to perform, men of broad ability and deep insight, men who develop rapidly, yet who endure the stress of responsibility, the strain of hard work.

Invention and improvement of machinery that could be used profitably in cigarette manufacturing, in effect, was responsible for the formation of corporations that sought to be controlling influences in the tobacco industry. From 1875 to 1888 the business of cigarette manufacturing developed slowly. The American Tobacco Co. was formed in 1890. The value of the cigarette output in the United States that year was about $9,000,000. In 1893, although production had increased steadily, the American Tobacco Co. had control of more than 93 per cent of the entire cigarette output of the country. In 1907 the American Tobacco Co. controlled 74 per cent of the cigarette trade, 70 per cent of the smoking tobacco, 81 per cent of the chewing and 89 per cent of the "little cigar" trade of the country. It purchased from 70 per cent to 80 per cent of all the leaf tobacco used for domestic consumption. With such a large percentage of the trade under its influence, the company was open to the charge of monopoly, and in July, 1907, the Government instituted suit under the anti-trust act of 1890. It was charged that the company had stifled competition, dictated both the prices of raw leaf and manufactured products. It was contended that its control of so large a proportion of the industry was injurious to the public interest. The American Tobacco Co. denied that its operations were inimical to the public welfare. The Supreme Court upheld the contentions of the Government, however, and in 1911 a plan of segregation or dissolution was ordered and became effective.

Under the plan of dissolution the business carried on by the American Tobacco Co. was divided up among fourteen separate companies, between which there were no controlling of interlocking interests. A new Liggett & Myers Co. and a new P. Lorillard Co. were formed, and a proportion of the cigarette, smoking and chewing trade sold to them for securities, which were in part subscribed for by stockholders of the American Tobacco Co. and used to retire some of the outstanding securities of that company. The stock of the R. J. Reynolds Tobacco Co. and other subsidiaries was distributed to the shareholders of the American Tobacco Co. The snuff, licorice and foil

businesses were divided up among companies, none of which had any ownership in the other.

After the disintegration the division of the tobacco business in all its branches was as follows:

and chewing trades were highly centralized, since their control rested among four large independent manufacturers instead of a widely scattered group of small manufacturers with relatively inefficient production methods.

VOLUME OF BUSINESS ASSIGNED TO VARIOUS COMPANIES

	Cigarettes Per cent	Smoking tobacco Per cent	Plug tobacco Per cent	Fine-cut tobacco Per cent	Cigars Per cent	Little cigars Per cent	Snuff Per cent
American Tobacco Co.	37.11	33.08	25.32	9.94	....	15.43	....
Liggett & Myers Co.	27.82	20.05	33.33	41.61	....	43.78	....
P. Lorillard Co.	15.27	22.82	3.73	27.80	5.72	33.84	....
R. J. Reynolds Tobacco Co.	....	2.66	18.07	....	....	....	....
American Cigar Co.	....	....	....	....	6.06	....	....
American Stogie Co.	....	....	....	....	1.58	....	....
American Snuff Co.	....	....	....	....	....	....	32.05
Geo. W. Helme Co.	....	....	....	....	....	....	30.88
Weyman & Bruton	....	....	....	....	....	....	29.25
Independents*	19.80	21.39	19.05	20.05	86.64	6.95	7.82

*Other companies never in any way connected with the combination.

After the plan of dissolution became effective, the control of the tobacco industry by the American Tobacco Co. was ended. With this condition existing the net results of the company's expansion since 1890 were, in their ultimate effect, beneficial. The most efficient methods of production were developed, making possible lower retail prices. Even after the dissolution the cigarette, smoking

Of the old American Tobacco Co., the net profits for 1910 amounted to $40,000,000. In 1923 the net profits of only four of the former constituent companies exceeded $55,000,000.

Since the dissolution of the "Trust" the earnings of the big four are indicated as follows:

NET PROFITS AVAILABLE FOR DIVIDENDS

	American Tobacco Co.	R. J. Reynolds Tobacco Co.	Liggett & Myers Co.	P. Lorillard Co.	Total
1914	$11,635,186	$2,916,564	$5,391,174	$3,221,965	$23,164,889
1915	11,234,581	4,729,988	6,800,276	3,528,178	26,293,023
1916	12,310,375	8,043,678	6,589,055	4,583,957	31,527,065
1917	13,321,510	10,340,345	7,363,720	5,928,480	36,954,055
1918	16,621,356	7,042,763	8,154,008	5,627,865	37,445,992
1919	15,972,572	11,272,753	5,929,037	4,980,376	38,154,738
1920	15,151,155	10,691,294	7,597,803	6,545,276	39,985,528
1921	18,254,664	16,258,323	9,854,158	6,371,821	50,738,966
1922	18,968,470	20,479,234	8,724,294	6,888,444	55,060,442
1923	17,768,690	23,039,876	9,622,396	5,038,042	55,469,004

FINANCIAL POSITION AS OF DECEMBER 31, 1923

ASSETS

Current Assets—	American Tobacco Co.	R. J. Reynolds Tobacco Co.	Liggett & Myers Co.	P. Lorillard Co.
Cash and securities	$14,091,109	$11,000,918	$13,813,816	$4,922,186
Notes and accounts receivable	11,563,105	12,729,067	9,369,299	6,698,553
Inventories	76,579,000	85,573,052	60,153,177	40,275,061
Total current assets	$102,233,214	$109,303,037	$83,336,292	$51,895,800
Other Assets—				
Real estate, plants, etc.	9,183,393	16,272,616	17,307,881	9,041,040
Miscellaneous investments	27,180,668	4,590,646	1,892,584	2,182,500
Deferred assets	432,184	291,036	.....	.....
Good will, brands, etc.	54,099,430	1,313,291	40,709,711	21,147,927
Total assets	$193,129,189	$131,770,626	$143,246,468	$84,267,267

LIABILITIES

Current Liabilities—				
Accounts and notes payable	$9,792,046	$2,954,728	$14,864,694	$3,446,184
Miscellaneous accruals	819,009	4,668,382	2,316,363	1,501,705
Total current liabilities	$10,611,155	$7,623,110	$17,181,057	$4,947,889
Miscellaneous liabilities	1,936,997	.....	.....	.....
Reserves—miscellaneous	6,036,668	7,192,418	5,654,454	2,344,506
Funded debt	1,387,000	.....	29,043,600	20,529,950
Preferred stock	52,699,700	20,000,000	22,514,100	11,307,600
Common stock	97,611,800	80,000,000	33,889,100	30,306,420
Surplus	22,845,869	16,955,098	34,964,157	14,830,902
Total liabilities	$193,129,189	$131,770,626	$143,246,468	$84,267,267

The South's Tobacco Production, Value and Exports

The South produces about 85 per cent of the country's tobacco crop. In 1923 the area planted in tobacco in the South was 1,621,000 acres, compared with 1,820,000 acres in the whole country. In 1923 the South produced over 1,264,800,000 pounds of tobacco, valued at $244,434,000, compared with the country's tobacco production of 1,474,786,000 pounds, valued at $298,936,000.

The South's tobacco crop was over 668,600,000 pounds in 1900; in 1910 the tobacco crop was 807,991,000 pounds.

In the following table are given the tobacco production and value by states in the South for 1900-1923:

Tobacco Production and Value in the South

States.	1900. Pounds	1900. Value	1910. Pounds	1910. Value	1923. Pounds	1923. Value
Alabama	311,950	$55,581	90,572	$14,892	*2,031,235	*$710,933
Arkansas	831,700	85,395	316,418	40,489	*267,050	*93,472
Florida	1,125,600	254,211	3,505,801	1,025,476	4,292,000	2,146,000
Georgia	1,105,600	159,659	1,485,994	297,167	11,237,000	3,371,000
Kentucky	314,288,050	18,541,982	398,482,301	39,868,753	494,190,000	82,036,000
Louisiana	102,100	20,488	172,418	42,617	465,000	232,000
Maryland	24,589,480	1,438,169	17,845,699	1,457,112	19,008,000	4,182,000
Mississippi	62,760	9,225	18,600	3,390	*725,577	*275,725
Missouri	3,041,996	218,991	5,372,738	676,479	6,600,000	1,848,000
North Carolina	127,503,400	8,038,691	138,813,163	13,847,559	386,400,000	81,144,000
Oklahoma	108,910	11,815	50,546	5,312	*36,697	*15,417
South Carolina	19,895,970	1,297,293	25,583,049	2,123,576	74,460,000	17,870,000
Tennessee	49,157,550	2,748,495	68,756,599	5,661,681	109,500,000	19,710,000
Texas	550,120	104,694	161,533	26,034	*27,067	*13,545
Virginia	122,884,900	7,210,195	132,979,390	12,169,086	150,960,000	30,192,000
West Virginia	3,087,140	228,620	14,356,400	1,923,180	7,740,000	1,703,000
Total South	668,647,226	$40,423,504	807,991,221	$79,182,803	1,264,852,000	$244,434,000
United States	868,112,865	$56,987,902	1,055,764,806	$104,303,856	1,474,786,000	$298,936,000

* Census of 1920 figures not included in total for 1923.

During the fiscal year ended June 30, 1924, the total value of the exports of tobacco of all kinds reached $193,338,000, as compared with $171,018,000 for the fiscal year ending June, 1923. Tobacco advanced from sixth place to fourth place among the total commodities exported, being exceeded only by raw cotton, mineral oils, and automobiles and parts.

During that fiscal year 557,288,000 pounds of leaf tobacco, valued at $166,441,000, were exported, as compared with 445,142,000 pounds, valued at $145,625,000, for 1922-1923. This is an increase of 25 per cent over the previous year.

During the five-year period 1910-1914 388,284,000 pounds of leaf tobacco, valued at $44,686,000, were shipped from the United States, chiefly to Europe. In 1922-1923 exports of leaf tobacco increased 14.7 per cent in quantity and a further increase of 25 per cent in export shipments over the preceding year was made during the last fiscal year.

During the first six months of 1924 322,851,000 pounds of tobacco leaf and stems were shipped from the United States, as compared with 221,206,000 pounds during the same period of 1923, or an increase during this period of over 45 per cent.

The Department of Commerce reports that a change has taken place in the types of tobacco which constitute these shipments. From January to June, 1923, shipments of dark-fired Kentucky and Tennessee totaled 73,451,000 pounds, which was 33 per cent of the entire quantity of leaf tobacco exported; cigarette tobacco of the bright flue-cured variety amounted to 57,092,000 pounds, or 25 per cent, while 34,719,000 pounds, or 15 per cent, was dark Virginia tobacco. In 1924 conditions were reversed, cigarette tobacco to the amount of 142,705,000 pounds constituting 44 per cent of the total shipments, dark-fired Kentucky and Tennessee occupying second place with 91,886,000 pounds, or 28 per cent. Shipments of Burley increased, but with the exception of dark Virginia, which decreased 50 per cent in 1924 compared with 1923, other types of tobacco have remained practically the same.

Shipments of cigarettes totaled 5,827,470,000 during the first six months of 1924, as compared with 5,818,357,000 during the same period of 1923, but their value decreased from $11,057,517 in 1923 to $10,653,244 in 1924.

Oranges and Grapefruit in Florida

The commercial orange crop of Florida for shipment during the season of 1924-25 is estimated at 13,400,000 boxes, or 2,000,000 boxes more than the shipments from the record crop of 1923-24. The commercial grapefruit forecast of 8,600,000 boxes for shipment also is a record, and exceeds the shipments of 1923-24 by 700,000 boxes.

The orange crop is harvested from 70 per cent of the orange acreage and the grapefruit crop from 75 per cent of the grapefruit acreage. About 27 per cent of the orange acreage and 30 per cent of the grapefruit acreage now producing crops are in young bearing groves and these young groves will bear much heavier crops in the next year or two.

Thirty per cent of the total orange acreage is at present non-bearing, of which one-half is in groves three years old or under and the remainder in groves over three years old. Of the 25 per cent non-bearing grapefruit area, slightly less than half is three years old or under and the remainder more than three years.

The Rice Industry in the South

By Raymond J. Martinez, Editor the Rice Journal, New Orleans, La.

Although rice is a plant of great antiquity, and has from time immemorial formed the staple food of the great masses of China, India and its adjacent islands, it was not introduced into this country as a commercial product until the close of the Seventeenth Century. There was a species of wild rice, Zizania aquatica, grown in certain marshy regions of North America, particularly in the vicinity of the Great Lakes, and its seed was once used by the American Indians for food, but its tendency to shatter upon ripening has made impossible its general cultivation. The genus Oryza, to which cultivated rice belongs, was introduced into Virginia as early as 1647, but little use was made of it then, and it finally disappeared altogether in this country. Forty-seven years later the captain of a trading vessel bound for Liverpool from Madagascar, whose vessel had blown out of its course and put into Charleston for repairs, gave the Governor of South Carolina a small package of rice, which incident marks the beginning of the rice industry in the United States.

Raymond J. Martinez

In the beginning, and indeed until in very recent years, rice production in this country was confined almost exclusively to South Carolina, and presently it was cultivated, though not extensively, in the states of Georgia and Florida. Shortly before the Civil War there was a comparatively small amount of rice grown in the Mississippi bottoms in Louisiana, but in the eighties the production of rice spread and became firmly established in the southwestern part of Louisiana, which, with the adjacent portion of Texas, now produces the greater part of the American crop. This section alone places on the market annually about 1,000,000,000 pounds of rough rice. This does not include the rice produced in the southeastern part of Arkansas, which now amounts to 320,000,000 pounds of rough rice every year. The area devoted to rice in the Southern states has increased greatly in the last twenty-five years, and is now estimated at 800,000 acres, with a yield of 27,500,000 bushels.

Taking each rice-growing section of the United States separately, we find the following total of acres devoted to the cultivation of that crop:

Rice Acreage, Variety and Production

	Total Acres	Rose Blue Acres	Early Prolific Acres	All long-grained rice combined Acres	Japan Acres	Total yield Bushels
South Carolina	8,000	.....	.....	8,000	.....	200,000
Georgia	3,000	.....	.....	3,000	.....	68,000
Florida	4,000	.....	.....	4,000	.....	50,000
Louisiana	485,000	391,000	20,000	58,000	16,000	15,132,000
Texas	150,000	70,000	33,000	32,000	15,000	5,238,000
Arkansas	157,000	89,000	12,000	39,000	17,000	7,183,000
California	100,000	.....	.....	.....	100,000	5,011,000

The rice industry in southwestern Louisiana and the adjacent portion of Texas has been developed to so great an extent during recent years that it has more or less superseded other erstwhile staple crops of those sections. Of the 560,000 acres of land under cultivation in southwestern Louisiana there are 485,000 acres in rice, and of the 200,000 acres of cultivated land in the rice-growing areas of Texas 150,000 acres are devoted to this crop.

The practice of cultivating rice has made its way clear across the southern part of the United States into California, where there is this year in the vicinity of Biggs, north of Sacramento on Sacramento River, 100,000 acres of land devoted to the growing of this crop.

On account of the varied conditions of soil, and also owing to the climate and culture under which rice is produced, many different varieties have come into existence, but there are only a few of agricultural importance. Among them are the Honduras, Japan, Blue Rose and Carolina Gold Seed. The latter, the husk of which has a golden-yellow color when it is ripe, ranks among the best varieties of the world as to yield, size and richness of kernel.

The Honduras variety is grown largely in Louisiana, Texas and Arkansas. Honduras rice produces a stiff culm and grows taller than other varieties of rice; the kernels are larger, they polish with a pearly luster, and thus command a higher price. But the Japan rice ordinarily produces a larger yield to the acre, and since the grain is shorter there is a smaller percentage of breakage in milling. Japan rice yields a smaller percentage of bran and polish, however, as its kernels are short and thick. It is produced chiefly in California.

Blue Rose rice is the variety most commonly grown in southwest Louisiana, southeast Texas and Arkansas. It was originated by S. L. Wright, a rice planter and breeder in southwestern Louisiana, about twelve years ago. It is not only a high-yielding variety, but it possesses excellent milling qualities, and has the advantage that it does not shatter very much at the time of harvest.

In order to obtain the best yield and quality, rice must be grown on low, level lands which will permit of irrigation. Still there are some varieties that do well on higher lands without irrigation, especially in the cotton belt east of the Mississippi, but the yield is uncertain, seldom large and the quality not so good as that of irrigated rice; hence its acreage is limited.

Though rice is a tropical plant, it thrives in semi-tropical regions. It is safe to say that the world's crop of rice is produced within an area lying between latitude 40 degrees north and south of the equator in both hemispheres. It does best, of course, in those regions whose climate is moist.

In order to produce rice economically it is essential that the land be level so that it can be flooded with from 3 to 10 inches of water during the greater part of its growing period. It is necessary to lay off the land in subdivisions so that the land inside of each subdivision will be approximately of the same level or the irrigation water will vary in depth in different sections of the field and

the crop will not head out and ripen uniformly. These subdivisions are usually laid off on contour lines and in sections of from five to thirty acres, depending upon the natural slope of the field.

Water is supplied the rice usually from rivers, bayous or wells. A large canal is constructed from the course of the water supply along the ridges or highest levels through the center or along one side of the area to be irrigated. The water is either syphoned or pumped into these canals, carried by gravity and an occasional relift, and is distributed through headgates to lateral ditches. By this means the water is conveyed to all parts of the various fields. And owing to the subdivisions, on all sides of which are levees, the water is evenly distributed. In periods of continued drouth salt water often ascends rivers and bayous for a considerable distance, and that is a great danger to the rice crop, for salt will destroy it completely.

The next step is to thresh the rice, and for this purpose a steam thresher is employed, except in some very rare cases where the primitive method of flailing is used. While the steam thresher breaks the grain more frequently than would be the case in flailing, it is nevertheless the most economical means of separating the grain from the straw, and without it any extensive production of rice in this country would be impossible.

The rough rice as it comes from the thresher is delivered to the rice mills for milling, and from there it is finally placed upon the market. Its commercial classification is as follows:

Head Rice: Consisting of the whole grain, containing slight amounts of broken.

Straights: Mostly of whole grain, but grading slightly lower than head rice. This is very seldom made except from very low-quality, rough rice, and for a special demand.

Rice Ready to Cut—Irrigation Water Drained Off

Rear View of Binder at Work in a Rice Field

This, of course, applies only to those sections adjacent to the Gulf.

Shortly before the rice is ready to harvest the water is drawn off the land, and the soil allowed to become firm before the crop is cut. Rice is ready to harvest in the fall when the grain begins to turn yellow and the straw is stiff. Usually the crop is harvested with an ordinary grain binder provided with special lugs on "bull wheel." The bundles are shocked and a cap bundle placed on the top so as to prevent exposure to the sun and rain as much as possible. This method of harvesting is common to the prairie districts of Louisiana, Texas and Arkansas. But in the South Atlantic states and the river section of Louisiana the grain binder is not so practical because of the bogginess of the soil at harvest time. Here the crop is more commonly harvested with a sickle, and the cut grain is laid on the stubble and allowed to cure for a day or two, when it is bound by hand into small bundles and shocked on dry ground.

Screenings: Consisting of medium-sized broken rice of which there are several grades.

Brewers' Rice: Consisting of very finely broken rice used in the making of beer, non-alcoholic cereal beverages, rice flour, and exported for other purposes.

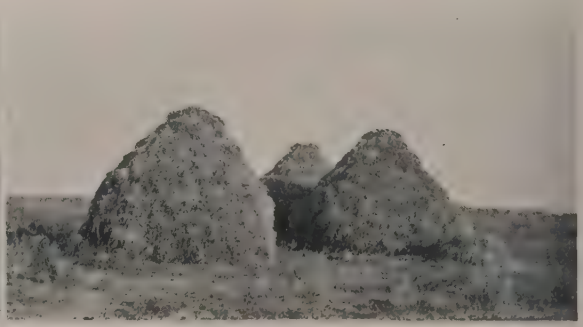
Rice Polish: Consisting of the highly nutritious flour from the kernel in the process of polishing.

Rice Bran: Consisting of the removed cuticle or bran layers and germ.

Rice Hulls: Consisting of the flouring glume and palea, or chaff.

The hulls, or chaff, are seldom sold, being largely used as fuel in the mills. There is a slight demand, however, for hulls for packing purposes. The bran and polish are very important by-products, used chiefly as a stock food, either alone or in combination with other materials. For this purpose rice bran is very excellent, having a greater *productive value* even than wheat bran. Moreover, it is rich, very palatable and easily digested. Rice polish is

Threshed Rice in the Field



Rice Stacks in the Field

generally used in the manufacture of mixed feeds, though it is excellent for fattening hogs and for milk cows.

Baling Rice Straw for Stock Feed

The various grades and commercial qualities of rice are sold by the mills in much the same manner as other food products; that is, through the agency of brokers. The brokers who sell rice throughout the United States are, in most cases, commodity brokers, who handle many other food products; but at such points as New Orleans, New York, San Francisco and Chicago there are many exclusive rice brokers. These brokers are paid for their service by the mills they represent on a basis of from six to eight cents per bag (pocket of 100 pounds). Rice is also distributed by dealers who buy direct from the mills, and who employ salesmen to travel throughout the country selling to wholesalers at a small margin of profit. Many of the milling concerns have good foreign connections, which enable them to export direct. Those who have not sell considerable quantities of rice to regular rice exporters. Rice in carlots reaches the wholesale grocer, who in turn distributes it to the retailer in small lots to suit his requirements.

Porto Rico is a very heavy consumer of American rice, buying each year nearly 2,000,000 pockets. This supply is necessary to meet the Porto Rican demand, since the per capita consumption there averages around 130 pounds of rice annually. In the United States the annual per capita consumption is around six pounds, but the tendency during recent years has been toward an increase.

Foreign buyers and many domestic buyers have now been educated to make their purchases on the basis of an *inspection.* Certificates of inspection—principally by the Rice Millers' Association Inspection Bureau—are issued only after a very careful sampling of the delivery and after a rigid examination. The United States Government has promulgated standards for milled rice, which are definite, specific and eliminate the personal equation in the judgment of rice quality. Inspection is comparatively recent, but is rapidly becoming the basis of most rice sales. It is an assurance to the buyer that the quality delivered is the quality purchased; therefore, it behooves every up-to-date buyer of rice, for his own protection, to demand of the shipper that an inspection certificate accompany the draft and bill of lading. It also behooves the shipper who is attempting to deliver the proper quality in accordance with the contract of sale to attach to his documents a certificate of inspection, thus eliminating any possible chance for controversies, rejections or cancellations. The inspection work is *properly done, is unbiased, and made by competent, well-trained men.* The man in charge of this work at New Orleans is F. B. Wise, secretary-treasurer of the Rice Millers' Association, who upon completing his studies at the University of Wisconsin in 1911 went to Washington as investigator of rice, scientific and commercial, and while there developed the Government standards. In 1919 Mr. Wise went to New Orleans, where he formed a connection with the Rice Millers' Association and continued to study and investigate rice. His work has indeed been of great benefit to the rice industry.

HARVESTING RICE

A treatise of this kind would be incomplete without a brief statement regarding the food qualities of rice; hence, in conclusion, the reader's attention is called to Farmers' Bulletin No. 1195, United States Department of Agriculture. This publication properly points out that rice is *nutritious, easily digested, palatable,* and in addition it is at all times one of the cheapest staple foodstuffs available for any housewife. Moreover, it can be prepared in a vast number of ways, and it can be used in combination with other foods. In addition, there is scarcely a food commodity known the left-overs of which can be used to so great an advantage in the preparation of delectable dishes.

Sugar Production Retarded by Endless Tariff Changes for a Hundred Years

By Reginald Dykers, 5th Vice-President and General Manager American Sugar Cane League, New Orleans, La.

"Ships, ships, ships—and still more ships!"

All of us remember how this cry, often with a note of desperation in it, echoed through the allied nations during the World War, and particularly in England, dependent for her sustenance on supplies from overseas. And in no single particular was there a more acute situation than in the commodity I will discuss in this article—sugar.

So far as general usage is concerned, sugar is of two kinds—cane sugar and beet sugar. It is, perhaps, incorrect to say that it is of two kinds, for when once made sugar produced from cane is identical with sugar produced from beets, but the two sources are quite distinct, inasmuch as sugar cane is a tropical or semi-tropical product, while sugar beets flourish even in such cold countries as Russia and Germany, and are grown to a large extent in such Northern states of this country as Michigan and Minnesota.

When the World War broke out England was in the habit of obtaining most of her sugar from the Central Powers, and while France produced considerable beet sugar in her northeastern provinces, these were overrun by the enemy and what was left was too limited to permit exports. Consequently the English Government, at the very outset of the contest, was confronted with a sugar problem that was one of the most serious that the English statesmen had to contend with. They had to buy sugar in all sorts of unaccustomed quarters, often in the face of fierce price competition, and then they had to overcome the submarine menace in order to deliver it in England. The lesson taught by this experience sank deep into the minds of economists all over the world, yet it was recognized that England was not entirely to blame for her predicament, inasmuch as attempts to produce sugar in the British Isles have scored repeated failures, and it seems as though the English are dependent on outside sources of supply through necessity and not through the crime of neglecting their own sugar-producing resources. At any rate, be the fault whose or what it may, England, Scotland, Ireland and Wales have never succeeded in making sugar on any considerable scale notwithstanding various forms of Governmental assistance.

During the World War, and at all other times up to and including right now, the United States produces within its own continental borders only about one-fourth of the sugar it consumes, and had the Germans been able to do so they would have seriously interfered with our sugar supply. In the event that we should get into a war with some nation that was able to control the sea we would literally starve for sugar. And in the case of the United States there are no mitigating circumstances to excuse the folly we are guilty of in not producing all the sugar we require at home, for we have the soil, the climate, the available land and labor to produce every pound of it, and a vast area suitable for the purpose lies in the Southern states.

Let us consider first Louisiana, not by any means because it is the only state, or even the most suitable state, but because it is a state in which sugar production from sugar cane has been carried on for over a hundred years, and in which the nucleus of an enormous sugar industry exists, awaiting only stabilized economic conditions, which, strange to say, it has never been permitted to enjoy in all its century or more of life, to expand to tenfold its present volume.

Sugar Production in Louisiana Since 1795

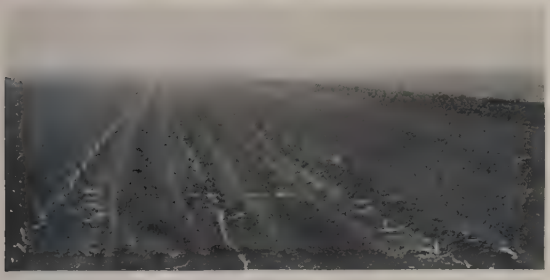
Sugar production in Louisiana began, in a commercial way, in 1795, when Etienne de Bore, a planter whose estate was situated where a part of the city of New Orleans now stands, made enough sugar to bring him a return of $12,000. Statistics are lacking as to the production of sugar in Louisiana between 1795 and 1823, but in the latter year 15,400 tons of sugar was produced in the state and ten years later this had arisen to 37,482 tons. In 1850 the production was 103,111 tons and three years later it took a tremendous jump, more than doubling the output, and reaching 224,118 tons. At the outbreak of the Civil War in 1861 the production of sugar in Louisiana was 235,856 tons. The war virtually destroyed the industry, which up to that time had been conducted, as were all the other agricultural industries in the South, by slave labor. In 1864 the sugar output was an insignificant 5000 tons, and one year later it was only 9000 tons. Thence for ten years the industry dragged its way towards a slow and painful recovery, and by 1874 the output had increased to 60,100 tons, made, it is interesting to note, in over a thousand little factories. How small they must have been can be realized from the fact that there are a number of single sugar factories in the world today that are capable of turning out 60,000 tons of sugar in a season unassisted.

It is a singular coincidence that in the years 1853 and 1878, both of them distinguished for yellow fever epidemics of extraordinary severity, sugar production in Louisiana made tremendous gains. As we have previously seen, 1853 registered close to the highest ante-bellum record, and in 1878 the production gave a definite leap upwards from the restricted post-war figures, reaching a total of 106,909 tons, against 65,835 tons the previous year. From 1878 the industry entered into what may be called its modern phase. The number of mills steadily decreased, while their individual capacity increased, so that in 1888 we find only 794 mills reported instead of over a thousand, yet the production had risen to 144,878 tons; in 1898 the number of mills had decreased to 334, and the production had risen to 245,511 tons. At present there are 128 mills in Louisiana, having an average capacity about 40 times as great as those existing right after the Civil War.

Tariff Changes Since Washington's Day Have Had Blighting Effect on Sugar Growing

We now come to a point where some reference must be made to the extraordinary economic policy pursued by the United States Government in connection with the sugar industry, and this applies, of course, to the beet sugar industry of the Northern and Western states quite as much as to the cane sugar industry of the Southern states. It has been the ill-fortune of the domestic sugar industry to be held in a state of perpetual uncertainty as to the degree of protection that it might expect from the com-

petition of cheap sugar made by slave, semi-slave, contract or excessively cheap labor in foreign countries. This uncertainty extends all the way back to the time of



Method of Planting Sugar Cane

George Washington, and as an example of economic heckling it is probably without parallel in legislative history. Such uncertainty has, of course, had a blighting effect that can hardly be overemphasized. That the sugar industry, beet or cane, in the United States has survived in spite of it, from General Washington's time to now, shows how vital the industry is in its fundamentals. Were it not, it would long ago have succumbed. The following résumé of tariff changes affecting sugar from 1790 to the present time will give some idea of the vicissitudes the industry has passed through in this respect and the uncertainty, timidity and caution with which, in consequence, capital has regarded it.

In the year 1790, when George Washington was President of the United States, duties of 1 cent a pound on brown sugar and 3 cents a pound on loaf sugar were levied by Congress. This was evidently a duty for revenue, as at that time no sugar was made in this country. Within one year the tariff was changed to 5 cents on white sugar and 1½ cents on brown. In 1795 another change in the sugar tariff was made, duties being reduced. In 1797 another change was made, the duty being raised. In 1800 another increase in the duty was made, under John Adams, and this higher duty prevailed during the two succeeding terms of Thomas Jefferson. The duty on white sugar during Jefferson's administration was 3 cents a pound and 2⅓ cents on brown sugar. In 1816, under James Madison, Democrat, the sugar tariff was changed again. The duty on brown sugar was raised to 3 cents, white sugar to 4 cents and "lump" sugar had a duty of 10 cents a pound clapped on it. In 1832 the duty was changed again, under Andrew Jackson, who reduced it. In 1842, under the Whig President, John Tyler, the sugar tariff was changed again, being increased on white sugar. In 1846, under James K. Polk, Democrat, came the first of those atrocities, the ad valorem duty. It was fixed at 30 per cent on all sugars. This endured through four Administrations, but in 1861, during the Administration

"D. 74" Cane, Variety Most Common in Louisiana

of Abraham Lincoln, the sugar duty was changed back to a specific rate. Four months later it was changed again, in 1862 it was changed again and in 1864 it was changed again, this making the fifteenth revision of the sugar duty in 74 years.

While in no way losing its original character as a duty for revenue, as the great bulk of the sugar used was still imported, the sugar tariff by this time was likewise protective to the growing domestic sugar industry, although changed so much, and so often in jeopardy, that no reliance could be placed on it by investors. With the Administration of President Grant in 1870 the duty on sugar was cut almost in two. Five years later the duty was given a horizontal increase of 25 per cent. One year after that Hawaiian sugar was admitted free, to the great discour-

HARVESTING, OR "CUTTING" SUGAR CANE

agement and unsettlement of the mainland sugar producers, already badly disorganized by perpetual tariff tinkering. In 1883 a further cut in the tariff was made, bringing the duty on everything under 13 Dutch Standard (raw sugar) down to 1.45 cents a pound, and 2.75 on sugar of a higher grade (13 to 16 D. S.). This remained in force eight years, and then occurred the crowning catastrophe. In 1891 the so-called "bounty law" was passed, calling for the admission of sugar free of duty with the payment for the specified term of 14 years of a bounty of two cents a pound on domestic sugar. The catastrophe consisted in the fact that after investing enormous sums in new machinery, based on the proposed 14-year bounty payments, the domestic producers were ruined right and left by the repeal of the bounty law in 1894, three years later, and the substitution therefore of a 40 per cent advalorem duty, which in practice was virtually no duty at all owing to low invoice values on imported sugars. By this time anybody who invested in domestic sugar production had to be a sort of reckless adventurer.

In 1897 the duty was changed again, this time upward. Three years later Porto Rican sugars were admitted free, unsettling the sugar manufacturing business, and two years after that Philippine sugars were admitted free, unsettling it again. In 1903 the Reciprocity Treaty was made with Cuba, admitting Cuban sugars at a 20 per cent preferential. This has proved harmful in the extreme to the production of domestic sugar, and just 10 years later, in 1913, came what looked like the last act in the tragedy of sugar, the passage of the free-sugar clause of the Underwood-Simmons bill. By the passage of that act the sugar industry of the United States was admittedly given its quietus. The United States Department of Agriculture offered the services of its experts to teach the sugar producers what to raise in place of cane or beets. Every preparation was made by the sugar men to wind up their business. Stubbles were plowed up; factories offered for sale to junk dealers or foreign sugar producers for removal abroad. There was no thought or plan on the part of anybody of continuing in business. But with the perversity that had endured since the days of George Washington the "sugar schedule" turned another somersault. Just before the "free-sugar" clause went into effect it was repealed!

The rope was cut from the neck of the condemned. Dizzy, bewildered, with fields abandoned or rearranged for other crops, with machinery sold, with ratoons destroyed, with everything to be started over again from the bottom, the domestic sugar producers were told of their reprieve and told to go back to sugar production, for the sugar was needed for the boys in the trenches! In 1921, under Harding's administration, a duty of 2 cents a pound was put on 96 test sugar. In 1922 this was changed to 2.20 cents a pound, the present rate. In 1924 the Tariff Commission took under advisement the recommendation of certain Cuban producers that the rate be lowered. For over a year they withheld action, paralyzing all initiative in the ranks of the domestic sugar producers.

Has there ever in the history of the world been such a chronology of Congressional crime as is shown from the above account of the tinkering with the sugar schedule that has been going on for one hundred and thirty-two years?

HAULING CANE ON A FLORIDA SUGAR-CANE PLANTATION

Sugar Growing Up to 1890 a Romance of Plantation Life

During the first hundred years of its existence, say from its inception during the lifetime of Etienne de Bore up to 1890 or thereabouts, the Louisiana sugar industry was, like every other agricultural industry, conducted on a large scale in the South, of a manorial character. A big, comfortable dwelling, inhabited by the owner, was the chief feature of each plantation. These residences, built always of brick, with wide porches, high ceilings to the rooms, and always enough rooms for not only the accommodation of the family but for large numbers of guests, overshadowed the sugar factory in point of size and conspicuity. They were always set in the midst of a splendid grove of live oaks, frequently the approach to the residence being through an avenue of these majestic trees, and such impressive avenues still stand in innumerable locations throughout the sugar-producing region of Louisiana; but the mansions, in nearly every case, are either gone entirely or are in partial or complete ruin. For thirty years or more the industry has entirely lost its manorial character, even individual proprietorship being now a rarity. The plantations and factories are conducted

by corporations, and utility and economy, rather than creature comforts and open-handed hospitality, hold sway. The old residences have been abandoned because of their very high cost of upkeep and because they were unsuitable to the life that is now led by the men in charge of sugar-producing properties. Their passing was perhaps inevitable, yet one can hardly refrain from wondering why we must so often in this world sacrifice the idyllic for the utilitarian. There are still perhaps half a dozen of the old ante-bellum residences remaining that are kept up, in most cases by owners who have no connection with the sugar business. The writer passed one of the handsomest of these a few days ago in the course of an automobile trip, and recalled how at that particular residence some thirty-five years ago a traveling salesman from New York called to see the proprietor about some new-fangled devise for increasing the extraction of the juice from the cane as it went through the crushing rolls. According to the young salesman, who related his experience to me, he knocked rather timidly at the front door, wondering whether he ought to go to the residence at all on business, but, as the proprietor could be found nowhere else, he ventured it. To his astonishment he was received and ushered in by the servant who opened the door as if he had been a long-expected and most welcome guest. The proprietor, who had been a general in the Confederate Army, seemed delighted to see him, bade him consider the house his home, wined him and dined him, kept him all night and saw that every wish was anticipated, and—didn't buy his machine. But the salesman says he was probably to blame for that himself, as he hadn't been there half an hour before he forgot what he went there for. At that time such customs had very generally died out, and a few years later the old general, the last to practice them, was gathered to his fathers. Now the traveling salesman in the Louisiana Sugar district needs the same equipment of good nature, resourcefulness and persistence that he would need anywhere else, and a hotel bedroom in a country town is where he sleeps.

Type of Old Plantation Residence in Louisiana

Texas and Florida as Sugar-Growing Areas

The two principal cane-sugar-producing states other than Louisiana are Florida and Texas. Of these, Texas took the lead at an early date, but subsequently lost it. In 1879, the first year for which reliable statistics are available, Texas had 10,224 acres in sugar cane and Florida 7938 acres. Ten years later Texas' lead had increased slightly, but 20 years later, in 1899, Florida had begun to creep up on her Rio Grande rival, planting 13,800 acres in sugar cane that year, against 17,824 in Texas. In 1919, the last year covered by the United States Government report before me as I write, Florida had outstripped Texas, the figures being 20,413 acres for Florida and 18,407 acres for Texas. At the present date the Florida lead has undoubtedly been further increased, for while there have been no cane-growing developments of consequence in Texas in the last few years, the development of cane growing in the Florida Everglades has been marked, the most important enterprise in this line being that of the Pennsylvania Sugar Co., which purchased 100,000 acres of land and has erected a modern sugar factory of the most efficient and up-to-date type, equipped with every apparatus and device for the production of standard granulated sugar. At present this company has 4000 acres of cane growing, and, with no adverse conditions, they should harvest 3000 acres of cane for their next grinding, beginning about February 1, 1925. The unusual rains of 1922 and lack of adequate drainage

CYPREMORT SUGAR FACTORY, LOUISIANA. CAPACITY 1400 TONS SUGAR CANE PER DAY

retarded their operations, but these drawbacks have been overcome and their prospects are promising for a good crop this season.

The cultivation of sugar cane in Florida antedates its cultivation in Louisiana, there being authentic reports of a sugar-cane plantation as far back as the year 1518, near where New Smyrna now is, and sugar cane was also raised at that early day in the vicinity of what is now Daytona, on the Tomoka River. There are still to be seen the ruins of old sugar mills, evidently operated by steam power, on the old Marshall plantation on the Tomoka River, and likewise on the Levy plantation on Crystal River, and the Gamble plantation on the Manatee River. In 1887 the first attempt to produce sugar in Florida by modern methods was made, a corporation being formed by Hamilton Disston of Philadelphia and R. E. Rose of Osceola county, Florida (who is now living in Tallahassee and to whom I am indebted for much of this data), with a capital of $100,000, to develop the St. Cloud plantation. Some wonderful results in tonnage of cane per acre were secured, and Mr. Disston became so enthused that he reorganized the company, capitalized it at $1,000,000, bought 36,000 acres of land and built a factory costing $350,000. He was largely influenced by the passage of the so-called "bounty" law, referred to previously in this article, which he, like the Louisiana sugar producers, believed would endure for the 14 years stipulated in the terms of the act. When the bounty law was wiped off the statute books by the succeeding Congress, bankruptcy and ruin came to this promising Florida venture, which had been predicated, in the scale of its expenditures, on the stability of a Government bounty. Hundreds of similar wrecks occurred in Louisiana and the beet sugar states, and the ruin of cane and beet sugar ventures was common throughout the country. The failure at St. Cloud set back sugar production in Florida for a considerable time. With such splendid land and an ideal climate for sugar cane, it is hardly to be doubted that, with the resources possessed by those now taking up anew the development of sugar production in Florida, the industry will go forward very rapidly indeed.

So far as sugar production in Texas is concerned, the industry there at present is a sugar-refining one rather than a sugar-producing one, and sugar-refining plants are established at points that are strategic as distribution centers and which possess conveniences for the importation of foreign raw sugar. Any description of the Texas sugar industry would simply be a recital of the destruction, by unstable national legislation, of a promising development. Texas, particularly along the lower Rio Grande, has almost limitless areas of land on which sugar cane can be profitably grown, but there has been little incentive to develop these areas into cane production. Confessedly they cannot compete with Cuba, and in this respect they are like all the other sugar-producing territory of the United States, both beet and cane. The determined effort necessary to create a great sugar industry in Texas has been lacking, and sugar production there has gradually dwindled from a maximum of 16,800 tons in 1908 to only 2800 tons in 1923-24. Nowhere has the result of our criminal neglect of our home-grown sugar possibilities been more conspicuous in its results than in Texas. Yet the possibilities in Texas are exceedingly great. There are lands in the valleys of the Brazos, Colorado and Rio Grande rivers sufficient in extent to produce far over a million tons of sugar a year if all put into cane.

AIRPLANE VIEW OF A SUGAR FACTORY IN LOUISIANA.

The sugar industry was started in Texas about the year 1840, and increased continuously until the Civil War, when, like in Louisiana, it became almost extinct, and in Texas there was but a slow revival. In 1868 two plantations were established in the lower Rio Grande Valley, one in Hidalgo county and one in Cameron county, but these enterprises languished, and it was not until after 1900 that real progress began to be made in sugar production in Texas. In 1909 there were four sugar mills in Fort Bend county, two in Brazoria county, one in Colorado

county, one in Wharton county and five in the lower Rio Grande district. In 1909 the sugar-cane acreage in Texas was estimated at nearly 40,000 acres, and in addition to the sugar mills mentioned there were some twenty-five or thirty syrup mills. In the Brownsville district the cane is grown under irrigation. A. W. Roth, a leading Texas sugar planter of the flourishing epoch of Texas sugar production, in the decade from 1908 to 1918, wrote to the Texas State Agricultural Department that, in his estimation, Texas is superior to Louisiana for cane raising, with not one-fiftieth of the possibility of losing a crop that Louisiana has. He declared the cost of production was less than in Louisiana, but could not meet that of either Hawaii or Cuba. In the face of such facts it is hard to realize that sugar production in Texas has dwindled instead of increasing. A fatuous tariff policy on the part of the United States Congress is the explanation.

The Food Value of Sugar

According to the Year Book of the United States Department of Agriculture sugar provides about 13 per cent of all the energy obtained from food consumed by the people of the United States, and although it supplies about 13 per cent of the energy or fuel value of the foods consumed its cost at retail, even including candy, which is sold at prices from 10 to 20 times the cost of the sugar used in its manufacture, is only about 6 per cent of the total expense for food. A pound of sugar yields 1820 calories of energy. At six cents a pound it provides 100 calories of energy for one-third of a cent, a figure that is lower than that of almost any other of the familiar food materials. In addition to the energy value of sugar, it imparts at the same time an agreeable flavor to food. If it were not for the presence of sugar the diet would be less palatable to most persons, and the use of flavoring extracts, spices and other flavoring materials would probably be much increased, which would add to the cost of the diet without adding directly to its food value.

An increase in the consumption of sugar in the United States and an increase of the production of sugar in the United States are two economic developments that can be unqualifiedly recommended, and this could be accomplished by an adequate and stable protective tariff.

The Citrus Fruit Industry of Florida

By George M. Chapin, Jacksonville, Fla.

When God made Florida, He laid the foundations in massive mineral-bearing rocks. He cemented them with clays for the brick and tiling for the building of a nation's cities, with kaolin equal to the best of Germany's deposits and with the world's greatest supplies of fuller's earth. He even scattered along the ocean beaches what were called rare earth minerals—rare until this inexhaustible supply was found, and their value for the uses of war and peace have been attested in the last ten years. Over all, He spread a blanket of fertile soils so variegated that they produce an assortment of fruits and vegetables and nuts and grains that no other land can match. He dented this surface with thousands of little lakes and lined it with courses for great rivers that should drain it and carry the ships of commerce. He planted great forests of pine and cypress and hardwoods, including half the varieties that He gave to the rest of the continent, and between them He set a profusion of beautiful flowers whose flaming colors should relieve the duller greens of the landscape. He stocked the waters, salt and fresh, with hundreds of varieties of food fish in unstinted abundance. He set this narrow peninsula down in the southern seas, so that their balmy breezes should forever create and preserve a climate of sub-tropical mildness.

And, when it was finished, He pronounced good this work of His hands, and He laid it aside for the coming of man. It awaited man's advent for centuries, and then God handed this bundle of opportunities over to him, as the master of old called his servants and entrusted to their care certain talents, each according to his ability, bidding them to make good and account to him of their stewardship.

And man has not failed in this trust. He has made Florida yield from her mines the finest of the world's phosphates and has sent them to enrich the soils of the earth. From the forests he has taken the rosin and turpentine which supply more than half the world's demands. He has also taken billions of feet of lumber from the forests, making it the standard for comparison in the world's markets.

But, it is from Florida's soils that he has reaped the richest returns. From them he produces one-tenth of the fresh fruits and vegetables that are consumed each year in the United States. In the eleven months of the shipping season of 1923-24 the shipments of these products averaged one carload every four and one-half minutes, or one every 270 seconds. The greatest and most valuable of these soil products is citrus fruit, making the Peninsula State one great orange and citrus grove. The magnitude of this industry may be best appreciated by recalling briefly the difficulties and disasters through which it has been built up.

Oranges and grapefruit were undoubtedly brought to Florida by the Spanish more than 300 years ago, and minor importations in later years were brought from Japan. From the original planting have been created the present groves. Little attention was paid to the development of grapefruit until about 1880, and up to that time oranges were the principal product. The original fruit was grown on seedling trees. The improvement by choice budded varieties on hardier stock was of later development. Shipment of citrus fruit, which had become profitable, was seriously cut down by a remarkable freeze in 1835. The principal growth was in the northern part of the state, but the groves were started again in the same section and the industry was checked again by a freeze in 1886, but the most disastrous cold came December 30, 1894, and the ruin was completed by an equally severe freeze in the following February. These two frosts cost the growers of the state $100,000,000, in the destruction of the bearing surface, the time necessary for its restoration and the consequent stoppage of allied industries. The last previous uninjured full crop to be harvested was more than 5,000,000 boxes; that following these freezes was less than 150,000 boxes.

This disaster taught the growers two important lessons. One was that it is not safe to carry all one's eggs in the same basket, and that one-crop farming is risky. The second lesson was that citrus culture must be undertaken no longer in the northern section of the state, but that it

must be moved to the warmer middle and southern parts if the growing of oranges in Florida was to be profitably continued. With characteristic energy and daring, the growers at once set about reproducing the bearing surface in the middle and southern counties. The wisdom of this movement was attested in February, 1899, when another wave of cold swept across the northern part of the state, registering some of the lowest temperatures ever known in Florida, but the new groves in south Florida escaped without serious harm. Also, with this transfer to the warmer section, more attention was paid to improving the fruit itself, in order to raise the standard of appearance, flavor and carrying qualities, and to the development of new varieties.

In the early days of the industry, oranges evidently were regarded as tough as potatoes, instead of delicate and easily decaying. The fruit was pulled from the trees, tumbled into barrels, irrespective of color or size, and the returns from shipment were small and disappointing, usually explained by the comment, "50 per cent decayed" or "entirely decayed." Closer attention, it was learned, must be paid to the careful handling of the fruit from the tree to the consumer. It was noted that the orange pulled or picked from the branch usually left the stem behind, which caused a break in the skin and a rupturing of the oil cells, and such breaks promptly started a decay that was quickly communicated to the pulp inside. The result of experience was the present methods of handling the fruit. It is first clipped from the tree so close to the fruit that no stub end of the stem is left to injure other fruit in the same shipping package. It is laid carefully, not dropped, in the picker's bag. It is carefully transferred, not poured, into the field boxes in which it is hauled to the packing-house. Some growers insist that their pickers and packers shall wear gloves in their work, in order to guard against scratching the fruit by the finger nails. Some, even more particular, require that the fruit shall not be touched by the bared hand after it has passed through the washer. In the packing-house the fruit is washed, dried and polished to improve its appearance. It is run on broad canvas belts to the graders, who assort it according to the grades established by the United States Department of Agriculture. All fruit showing signs of broken skin or other blemishes is thrown out. Next, the fruit is put through the sizers, mechanical contrivances which divide the fruit by the diameter, and these sizes differ by only one-eighth of an inch from the sizes larger or smaller. The fruit then goes to the packer. This worker wraps each piece of fruit in a square of soft paper, making the twist of the wrap over the stem end. It is placed in the box in layers, planned according to the size that is being handled, for two sizes are not packed in the same box. The "flush" pack is generally used in Florida, so that the top layer extends slightly above the edge of the box, and as no orange has been placed directly above another in the lower layer, but in the spaces between the lower fruit, it is possible to press the cover on the fruit and to crowd it tightly together and make a solid package in which the fruit will not shake or rub, and a box of fruit so prepared will carry round the world and back safely, with the ordinary risks of transportation. Through all the packing, grading and other manipulations, the most careful inspection is maintained to assure the best results and prices, and before the package is ready for shipment it must be stenciled to show the grade and size of the included fruit. Generally, the grower's name and address and any brand that he may have for his output are also stenciled on the box.

The development of the quality of Florida fruit from the neglected Spanish stock to the present high grades of uniform excellence is an interesting history in evolution. The seedling stock had the disadvantage of weak growth and was subject to foot-rot and was not highly resistant of cold. It was discovered that the wild sour stock, some-

A FLORIDA ORANGE GROVE—A STATE WHICH PRODUCES

times found growing in the woods, or the trifoliate stock was much hardier and had many desirable qualities, and by budding choice varieties on this stock the finest results were secured. The development of these varieties has been carried on with almost infinite patience in the decades past. It was known that the orange seed planted and raised to a bearing tree does not come "true to type," which means that the tree raised from the seed produces fruit that may in no degree resemble the fruit of the tree from which the seed was taken. It might be an improvement on the parent tree or it might be worse. The chances were that it would be different. In this way, many choice fruits were discovered or evolved and they were budded to hardy stock and a new variety was given to the world. The varieties of oranges produced in Florida are as distinct as those of apples in Northern climates. They vary in the time of blooming, of maturing, in their flavor and appearance, and even in their shipping qualities. They have been named from their originators or by his whim or choice. There are several varieties known as the "kid-glove" oranges, so-called because the skin may be removed easily from the pulp without soiling the fingers. The tangerine and the mandarin are typical of this fruit. They are delicate in flavor and are classed as "fancy." The satsuma belongs in this class; it is a hardy fruit, withstanding more degrees of cold than any other, and for this reason it is grown largely in the northern part of the state and, indeed, in others of the middle Southern states.

Lemon culture has not been made a successful commercial venture in Florida, but many growers insist that there is no climatic or soil reason why it should not be made profitable. The lime is produced abundantly on the Florida keys. It matures and is shipped mainly in the summer months. Approximately 1100 barrels, each carrying 1000 limes, were shipped last summer. Many consider the lime the finest fruit acid, even superior to the lemon. The kumquat is a small fruit, which grows on dwarf trees. The fruit is oblong, about one inch long by half that diameter. It is eaten skin and all, and has a not unpleasant acrid flavor.

Grapefruit varieties are fewer than those of oranges and there is less distinction between them. They vary somewhat in the time of their maturing. Usually, they are ripened about a month later than the orange and hang on the tree a month later in the spring. Florida's strongest competitor is California, which shipped in the season of 1923-24 a total of 40,687 carloads of oranges, the equivalent of sixteen and one-half million boxes. The standard box in the Pacific state is smaller than that of Florida. California, however, cannot compete with Florida in grapefruit, for the quality is much below that of the Southern state product, in both appearance and flavor. California practically supplies and controls the markets west of the Mississippi River, into which territory Florida has made but little headway. The sharper competitive field is the middle North and East. To reach these markets California has preferential freight rates of about the same figure for 2000 miles of transportation that Florida growers pay for half that distance.

The matter of marketing the Florida crop is of vast importance, not to say complexity. The especial demands and peculiarities of each of the principal Northern and Eastern markets must be known accurately and be watched carefully. Fruit may not be sent profitably to a glutted market, and to prevent this it requires co-operative control of shipping. This was not successfully supplied in Florida until the organization of the Florida Citrus Exchange. This organization is based upon the incorporation into membership in local associations of growers in a central district, where the amount of citrus cultivation warrants. There are about 130 such associations in the

THE WORLD'S FINEST ORANGES AND GRAPEFRUITS

state. These, in turn, are grouped in fourteen sub-exchanges, and the entire organization is under the direction of the main exchange at Tampa. Each association has its own fully equipped packing-house, and is operated under the direction of a manager, a field manager and the necessary force of skilled pickers, packers and workers. Every member of the association is pledged to turn over all his fruit to be handled in the association packing-house and by its operating force. This insures uniformity in grading and packing according to the rules of the Exchange. All the fruit is sold through the Exchange at Tampa, collections are made by it and returns made direct to the grower. No commission is charged for selling the fruit, but a charge per box is made for packing and shipping. The Exchange is not operated for profit, and at the end of the season the accumulated fund for packing is audited, the legitimate expenses of the Exchange are deducted and the remainder is returned as a dividend to all the grower members according to the amount of fruit that each has shipped during the season.

Outside the Exchange are a number of strong independent operators. Some of these own extensive groves, packing and shipping their fruit from their own packing-houses, also handling and selling fruit for their clients, and often buying large quantities of fruit on the trees. They are skillful traders and maintain the closest touch with all outside selling points.

There are also many extensive growers who raise, pack, ship and sell their own fruit, either on consignment or by sending it to the auction-houses in Northern and Eastern cities. In fact, a large share of Florida's citrus fruit finds its way for final sale into these auction-houses.

The rapid increase in the production of grapefruit in Florida within the past few years is shown herewith:

Season	Oranges Boxes	Grapefruits Boxes	Totals
1818-19	5,700,000	3,200,000	8,900,000
1819-20	7,000,000	5,500,000	12,500,000
1920-21	8,700,000	5,100,000	13,800,000
1921-22	7,300,000	6,000,000	13,300,000
1922-23	9,300,000	7,600,000	16,900,000
1923-24	11,330,160	7,703,760	19,033,920
1924-25	*13,400,000	*8,600,000	*22,000,000

* Estimated.

The estimates for the present season, 1924-25, are the forecast of United States Government experts. Commissioner L. M. Rhodes of the State Market Bureau has for many years kept accurate records and tabulations of Florida fruit and vegetable production, of its movements, prices and the annual increase of each commodity; he gave the freest use of his records and tabulations for the production of this article.

The matter of protecting groves from sudden cold snaps has been developed, so that the possibility of cold is no longer as dangerous as in the past. To guard against extreme cold, which sometimes decends on Florida, artificial methods of heating or protection have been used and with good results.

The strict grading that is maintained in the packing-houses creates a large surplus of "culls." What percentage this is of the total crop is impossible to ascertain, but not all culls are unfit for consumption. The legend is displayed prominently in many packing-houses, "All doubtful oranges are culls." Of course, all fruit that shows any indication of decay must be thrown out; but, in addition to these faulty pieces, there remains a large bulk that is thrown aside on account of the scars of thorn puncture, tree rubbing and other accidents of the growing season, which put them in the discard because of faulty appearance, but does not in any degree affect the flavor or juiciness of the fruit.

Already the juices of orange and grapefruit have been made the bases of enjoyable and popular fountain drinks. The canning of grapefruit has become an important industry in the state and the demand for the product is reported to exceed the supply. The value of the culls has not been realized and its complete development is one of the problems of the future.

The Florida orange reaches its normal size some weeks before it is ripened by weather on the tree to its rich yellow coloring and before the development of its matured flavor. The proper balance of the acid of the fruit and the content of juice comes only with natural ripening on the tree, and it gains uniform color only by coming to full maturity in the weather. Some unscrupulous growers pick the green fruit as soon as it reaches mature size, and by a process of heating it under cover produce an unnatural color, and it is shipped to the eager Northern markets before it is fit for eating. It is sour and actually unwholesome by too much acidity. The Federal pure-food law has been construed to prohibit this practice and Florida also has legislative enactments against it, but so far this legislation has proved to be inadequate, as has been proved by several court decisions. The abuse is watched closely through inspection co-operation between the State Market Bureau and the representatives of the Federal Department of Agriculture, Bureau of Economics.

Commissioner Rhodes was asked if there are not prospective risk and danger of overproduction of citrus fruits. He replied:

"If the 66,500,000 boxes of oranges grown annually in the world could be so distributed that every one of the 1,800,000,000 inhabitants of the earth could have his share, he would have one orange every fifty-two days. If all the oranges grown in the United States could be evenly distributed among the residents of the United States and Canada, each would have fifty oranges a year, almost one a week. If all the grapefruit grown in the United States and Porto Rico could be divided equally among the residents of this country, each would have three and one-third grapefruit a year, or one every 109 days. That doesn't look much like overproduction.

"There are now in Florida, using approximate figures, about eleven million bearing citrus trees and seven million non-bearing trees which will come to production within the next three to five years; probably a little more than one million trees each year. Real estate men and other developers are setting new groves at the rate of at least a million trees a year. These are to be sold to Northern and other buyers who are attracted by this form of investment, and the output from Florida groves is bound to increase rapidly, until Florida will be the great orange grove of the world. I expect to see a fifty-million-box crop in the future."

Florida growers have been good advertisers; the campaign is to be pushed during the season already begun and bolder plans for marketing are to be undertaken. It is understood that a great ocean steamship is to invade the British market this season with a big consignment of refrigerated Florida citrus fruits. The Englishman has been for years eating oranges from Spain and Italy and they are no novelty to him. But within the few recent years he has developed a special fondness for Florida-grown grapefruit, and Florida purposes to cater to and encourage the appetite by furnishing ample supplies. With such a market only comparatively a few days away, the effort to enter it with the finest product in the world should be successful.

Possibilities of Peanut Culture in the South

By Geo. W. Carver, Department of Research and Experiment Station, Tuskegee Institute, Alabama

An old and trite saying is that "coming events cast their shadows before." This is absolutely true as it relates to the peanut industry and its almost limitless possibilities.

Both the origin and the antiquity of the peanut are yet mooted questions. We do know, however, that it is of very ancient origin, and back as far as the Fifteenth Century various names, such as mandubi, monkey-nut, goober, etc., have been given in its process of evolution. It is generally conceded that the peanut was introduced into America in colonial days, but it was not recognized as a commercial crop until 1870. The Popular Science Monthly for May, 1923, makes the following significant statement:

"Twenty-five years ago the peanut was a 'no account' in American agriculture. Today the annual production of peanuts in the United States—about 53,000,000 bushels—would fill a tank nearly two miles square and 1¼ miles high."

The yearly production of peanut butter alone is more than 7,000,000 pounds, and of peanut oil more than 3,000,000 gallons.

The division of crop estimates forecasts the acreage and yield of crop in the United States for August 1, 1924, as follows, which means only plantings to be harvested, for nuts are included in the above estimates. The 950,000 acres planted yield upwards of 635,000,000 pounds. Of the twelve Southern states growing peanuts in commercial quantities, North Carolina, Georgia and Virginia are in the lead both in point of acreage and production, as can be readily seen by the following table:

Final Estimated Yield, 1923

State	Pounds
Alabama	66,598,000
Arkansas	11,050,000
Florida	48,000,000
Georgia	77,824,000
Louisiana	7,650,000
Mississippi	9,000,000
North Carolina	162,800,000
Oklahoma	9,750,000
South Carolina	32,300,000
Tennessee	13,090,000
Texas	75,640,000
Virginia	122,760,000
Total	636,462,000

Owing to the phenomenally high nutritive properties of the peanut, its popularity as a staple article of food has and is destined to grow by leaps and bounds, which means that production will not be commensurate with consumption; so, therefore, we must look ahead and increase the acreage and also the yield per acre. The South in this respect has everything in its favor. The seasons are long, making it possible for the fullest development of the jumbo types and other large growing varieties, while two crops per year can be made of the small Spanish varieties.

In both protein and high oil content, peanuts grown upon our Southern soils compare most favorably with those grown in other countries, and in many instances exceed them.

Our fine, sandy soil, hot sunshine, abundant rainfall, etc., all contribute to making the South unequaled for growing large yields of peanuts high in oil and other food nutrients and also producing a light-colored pod which meets the demands of the trade.

In 1919 the farmers living on the sandy lands of Texas decided they would plant peanuts extensively and compare it as a money-making crop with cotton. They found that the farm value of an acre of peanuts was $59.50, and on the same date the acre value of cotton was only $45.50, which means that $14 more per acre was received for the peanut crop than the cotton crop. Another important thing must be borne in mind, and that is that the $14 does not represent all of the money value for the peanut crop.

The hay as a stock food ranks above that of timothy and very favorably with that of red clover in proteids and fats, while the results from Bulletin 143 of the Alabama Experiment Station should inspire every hog raiser especially. Exhaustive feeding tests were made covering a period of three years, in which it was proved that peanuts are the cheapest producers of pork acre for acre in all the list of hog crops. That is, as a whole, peanut pasture was found to be more useful than any other pasture tried.

The same station found that in feeding grain with the several hog crops the average amount of grain required in connection with the pasturage to produce a pound of pork was 1.77 pounds with peanuts, 2.30 pounds with chufas, 2.68 pounds with rape, 3.07 pounds with cowpeas, 3.13 pounds with sweet potatoes and 3.70 pounds with sorghum.

Bulletin No. 73 of the Arkansas Experiment Station shows that one-fourth of an acre planted in peanuts produced 313 pounds of pork, as compared to 109 pounds from a plot the same size planted in corn—a difference of 204 pounds in favor of peanuts. An analysis of these results shows very conclusively that the South could with a little effort become one of, if not, the greatest pork-producing sections of the United States, our mild climate and sandy soil being much in our favor.

Careful experiments show further that the yield of nuts varies from 25 to 150 bushels. The yield of hay also varies from a few hundred pounds to 3500. In considering the peanut's list of virtues and its special adaptability to Southern agriculture, we must constantly bear in mind that it is a great soil builder, bringing large quantities of nitrogen from the air, and with proper husbanding on the farmer's part, depositing it in the soil, it is therefore suitable for almost all kinds of crop rotation.

Peanut oil is also gaining in favor in proportion to the rapidity with which the housewife and certain manufacturers of food products become acquainted with the superior value of peanut oil as an edible oil. It makes margarines of superior flavor and quality, while it is considered far superior to olive oil, where a high or continued heating of the oil is required.

Domestic Shipments of Peanuts

(For period from October 28, 1923, to August 9, 1924)

	Shelled Pounds	Unshelled Pounds
Virginia-Carolina Section	69,188,745	71,637,174
Southeastern Section	62,969,995	.....
Southwestern Section	9,445,190	.....
Total	141,603,930	71,637,174

It takes but a glance at the total imports, the total domestic shipments and the total number of pounds of

shelled and unshelled nuts to supply our demands to see what a great opportunity the American farmer has to supply this ever-increasing demand, and with the established fact that our Southern soils, climate, etc., are particularly adapted to the production of peanuts of fine quality.

Since all business is governed practically by the law of supply and demand, a new vista opens up to the South, revealing a number of possibilities along lines stressed but little or not at all heretofore. Thanks for the many new and unique advertising mediums to increase the consumption of the peanut, there must be greater and more concerted action before the goal of our highest hopes is attained. The people of the South, where the peanut thrives better than in any other spot in the United States, should be foremost in this advertising campaign. It is nothing short of startling when we think, or better see, 167 products made from this remarkable little nut. Some of the products almost baffle description and shake one's belief in their authenticity until definitely proven by a demonstration. I am appending a few of the products in order that the reader may get at least a glimpse into the almost limitless future for this great crop.

Everyone is more or less acquainted with and appreciates the delicious taste as well as the food value of Peanut Brittle, Peanut Fudge, Peanut Cream Candy, Peanut Cracker-Jack, Peanut Butter, Salted Peanuts, etc. Chief among those with which we are less familiar is an emulsion, sometimes called peanut milk, which consists of a perfect emulsion of the oils, fats, proteids, carbohydrates and some of the ash of peanuts. When properly made, it is one of the most perfect and stable emulsions I have ever seen. Thirty-two different grades can be made. In keeping qualities it is about the same as that of cow's milk, yielding about the same quantity and quality of curd as that of cow's milk. A rich, fatty scum rises on some of the grades similar to that of cow's milk.

Sprouted Peanuts—They make a delicious vegetable when prepared like asparagus tips. The peanuts are sprouted in the dark and the sprouts used before they turn green. They form a base for some very appetizing and nourishing salads.

Dyes—To date, 17 dyes are made from the vines and skins, ranging in color from the deepest orange to various shades of "khaki," tans, mustard greens and intense reddish browns.

Hydrogenated Peanut Oil—It is a most satisfactory compound for frying and many other culinary necessities.

Peanut Oleomargarine—Constitutes one of the most acceptable of the oleos manufactured.

Peanut Breakfast Food—Three very acceptable ones have been perfected and we hope to see them on the market before many more months pass.

Peanut Punches—These represent an almost endless number of attractive beverages made in two different groups. In group A is a milk punch, very rich in fats, proteids and other food nutrients of the peanut plus fruit juice, adding palatability to this highly concentrated foodstuff. It is truly a milk punch. Group B is perfectly clear and results from the coagulation of the milk—in fact, these are the wheys; they, too, contain food nutrients and are not only palatable but nutritious and handsome in appearance.

Worcester Sauce—The peanut, to my mind, forms as acceptable a base for Worcester Sauce as the soya bean.

Cleansing Cream—This is a pomade for the skin, and is said by those who have tried it out to be the very best cleansing cream they have ever used. When applied to the skin and rubbed lightly it rolls quickly and cleanses thoroughly.

Peanut Emulsion—This is truly a wonderful product, consisting of all the food nutrients of the peanut, plus the vitamines and a very high oil content, all of which are emulsified with creosote and other well-known specifics for bronchitis, coughs and other forms of pulmonary troubles. It is also an ideal antiseptic for the digestive tract. Physicians are trying this product out and everyone so far reports most excellent results. In the hands of physicians I believe there is a great future for it, as the patient can get a food and medicine combined, highly nourishing and very palatable.

I have not even given a bird's-eye view of the 167 products made from the peanut; indeed, the number has by no means been exhausted; many others are to follow. I think enough has been given, however, to show very clearly what could be achieved by a well-directed advertising campaign solely in the interest of consumption.

Here, indeed, is a great opportunity for the South.

The Pecan Industry in the South

By R. E. L. Niel, Albany, Ga.

When one sets out to tell of the pecan industry in the South, reference is made entirely to the cultivated, or what is erroneously called the paper-shell pecan. The seedling pecan, which abounds in its native or wild state in Texas and other sections, has largely increased in its market value and in demand as the excellence of the pecan itself has become better and better known. The pecan has been in cultivation less than twenty years, its birthplace having been around Biloxi and Ocean Springs, Miss., but Albany, Ga., and the surrounding section have been given the soubriquet of "the World's Pecan Center."

About twenty years ago the cultivation of the pecan was begun, and the late Prof. John Craig of Cornell University selected the Albany district as favorable in soil, climate and other conditions to the highest development of pecan groves. It was in 1908 that the real industry was begun, and it is interesting to recall that there is recorded a deed for 5000 acres of land near Albany which was proposed to be used for pecan groves, in which the stipulation was distinctly set out that one hundred acres of the tract was to be planted in pecans by 1920 or the sale should become void and of no effect. Every acre of the 5000 covered by this deed is now covered with bearing pecan trees.

From 1910 to 1920, according to the figures of the last United States census, the number of pecan trees, bearing and non-bearing, in Virginia, North and South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas jumped from 2,951,272 to 4,748,864, or an increase in the ten years of over 60 per cent. These figures cover not only the budded, grafted or cultivated variety but the seedlings as well.

That the industry is steadily increasing is borne out by the fact that in Georgia alone, which had 1,099,003 trees in 1920, there were in 1924, according to the Year Book of the Georgia Department of Agriculture, 1,592,427 trees, or about 80,000 acres devoted to the cultivation of this nut. Figures are not available, but it is reasonable to suppose that equally as great forward strides have taken place in many of the other Southern states. It is, therefore, not a venture to predict that by 1930 there will be shown in the 13 states of the South more than 10,000,000 trees.

If 30,000,000 pounds of pecans were produced in the Southern states in 1920 from less than 5,000,000 trees, certainly 60,000,000 pounds may be confidently expected by 1930 or at the end of the next six years. To give an accurate price or even average for any pecan crop in the entire South is difficult. The Texas, Oklahoma and some other states crop prices are based on seedlings, with the average range of about 20 cents per pound, while the cultivated or paper-shell pecan brings from 35 to 65 cents per pound. But, making a haphazard figure of seedlings and paper-shell combined, a fair price per pound would be 40 cents and the value of the crop in a few years would approximate $24,000,000.

Thus it will be seen that even while the pecan industry is in its infancy, it is a growing asset and offers a wide opportunity for investment and the reaping in time of large returns. "In time" is used advisedly, because the pecan industry is not a get-rich-quick scheme. Pecan trees produce a few nuts at an early age, but require several years—seven to ten—before they will yield sufficient revenue to pay dividends.

The following are the census figures of the number of pecan trees and the production in the South, by states:

PECAN TREES IN THE SOUTH

States	1910	1920	Increase	Per cent increase
Alabama	167,417	434,104	266,687	159
Arkansas	27,769	47,730	19,961	70
Florida	212,819	322,130	109,311	50
Georgia	401,279	1,099,003	697,724	173
Kentucky	4,577	9,802	5,225	114
Louisiana	156,074	197,039	40,965	26
Mississippi	208,524	387,680	179,156	85
North Carolina	27,657	54,697	27,040	97
Oklahoma	150,471	519,130	368,659	245
South Carolina	76,965	148,050	71,085	90
Tennessee	5,346	11,129	5,783	108
Texas	1,509,169	1,502,111	*7,058	...
Virginia	3,205	16,259	13,054	407
Total	2,951,272	4,748,864	1,797,592	60

* Decrease.

States	Trees not of bearing age	Trees of bearing age	Production (pounds)
Alabama	257,671	176,426	1,179,735
Arkansas	27,523	19,907	364,342
Florida	208,613	113,547	1,025,673
Georgia	654,422	444,834	2,544,688
Kentucky	2,257	7,591	50,352
Louisiana	101,964	95,075	2,262,666
Mississippi	255,468	132,212	1,592,177
North Carolina	37,227	17,470	145,753
Oklahoma	108,650	400,480	4,296,642
South Carolina	90,025	58,025	525,783
Tennessee	7,002	4,127	74,715
Texas	451,433	1,050,678	16,803,543
Virginia	3,897	12,452	33,927
Total	2,206,152	2,532,824	30,899,996

A GEORGIA PECAN GROVE

The Waterways and Harbors of the South

By S. A. Thompson, Secretary National Rivers and Harbors Congress, Washington, D. C.

The sixteen states and the District of Columbia which make up "The South" have a combined area of 969,237 square miles, which is almost one-third the area of the continental United States, excluding Alaska.

The coast line of the South, both on the Atlantic and the Gulf, is characterized by an endless succession of bays, sounds, inlets, lagoons and channels protected by outlying islands, or, as at the lower end of Florida, by a fringe of reefs. According to the Geological Survey, the general outline of the coast has a length of 2759 miles, while the length of the tidal shore line is 8125 miles.

S. A. Thompson

A glance at a good map will show, far better than any description, the great Mississippi River system—which drains an area of 1,250,000 square miles and contains more than 15,000 miles of navigable waterways—and the multitude of lesser rivers which flow, mainly from the Appalachian Mountains, into the Atlantic or the Gulf.

On the accompanying outline map the heavy, unbroken lines indicate waterways which are being improved or maintained by the United States Army Engineers. The aggregate length of such waterways lying wholly within the Southern states is 17,675.31 miles. In making up this total no part of any river is included which lies above the official "adopted project," but naturally navigable portions lying below the official project are included. Chesapeake Bay and scores of other navigable bays and sounds are omitted because they are not under improvement.

Certain other waterways are included, although they do not lie wholly within the South, viz, the Delaware and Chesapeake Canal, the Monongahela, the Ohio and that part of the Mississippi which makes the boundary between Illinois and Missouri. Three privately owned waterways are also shown, viz., the Chesapeake and Ohio, Dismal Swamp and Florida East Coast canals. In tabular form we get the following:

Mileage of Southern Waterways

United States Waterways	Miles
Within the Southern states	17,675.31
Bordering the Southern states	1,486.40
Privately owned waterways	557.00
Total	19,718.71

If all the bays, sounds, bayous and rivers should be included which, while not under improvement by the Government, are actually used for navigation, the total would be at least 21,000 miles. These Southern waterways are inseparably associated with the history of the past, sustain a relation to the development of the present far more important than is generally realized, and have potentialities for the future which outrun the imagination.

When the continent was discovered, practically the whole country east of the Mississippi was one vast forest. Inevitably, therefore, when the westward movement of population began the route was up the rivers flowing into the Atlantic and then down those flowing from the mountains toward the west. Of these westward-flowing streams the Ohio River was the one most largely used.

In the movement of immigrants downstream and, later, to accommodate the traffic that developed as settlements became established, floating craft of many kinds were used—birch-bark canoes, pirogues (hollowed out of logs), batteaus (made of rough planks), keel boats (long, narrow, pointed at both ends and used for passengers as well as freight), barges (the largest carrying not more than 100 tons, taking a month to drift downstream from Pittsburgh to New Orleans and the rest of the year to come back) and flatboats. The flatboat was the "boat that never came back," being sold for lumber on reaching New Orleans, leaving the owner to make his way home as best he could. In the decade from 1820 to 1830, 3000 flatboats annually descended the Ohio. The number of arrivals at New Orleans in 1847 was 2792; ten years later it was only 541.

A new era in water transportation dawned in 1811, when the "New Orleans," the first steamboat on Western or Southern waters—built for Fulton and Livingstone—started on its epoch-making journey from Pittsburgh to the city for which it was named. Within five or six years thereafter public confidence in the new form of transportation had become established, and in a few years more steamboats were plying on practically every river that could be navigated, even in time of flood.

The population west of the Alleghenies in 1820 was less than 2,000,000. Not pages but volumes would be needed to describe the increase in population, the growth of cities, the development of every kind that took place during the following forty years. To all of this the steamboat had a vital and casual relation, for transportation is the dynamic factor in development, and the steamboat was the dominant factor in transportation up to the outbreak of the Civil War; albeit, in the last decade of the period, that dominance was no longer undisputed. A hint of this development, and of the part played therein by the steamboat, is given in the following table:

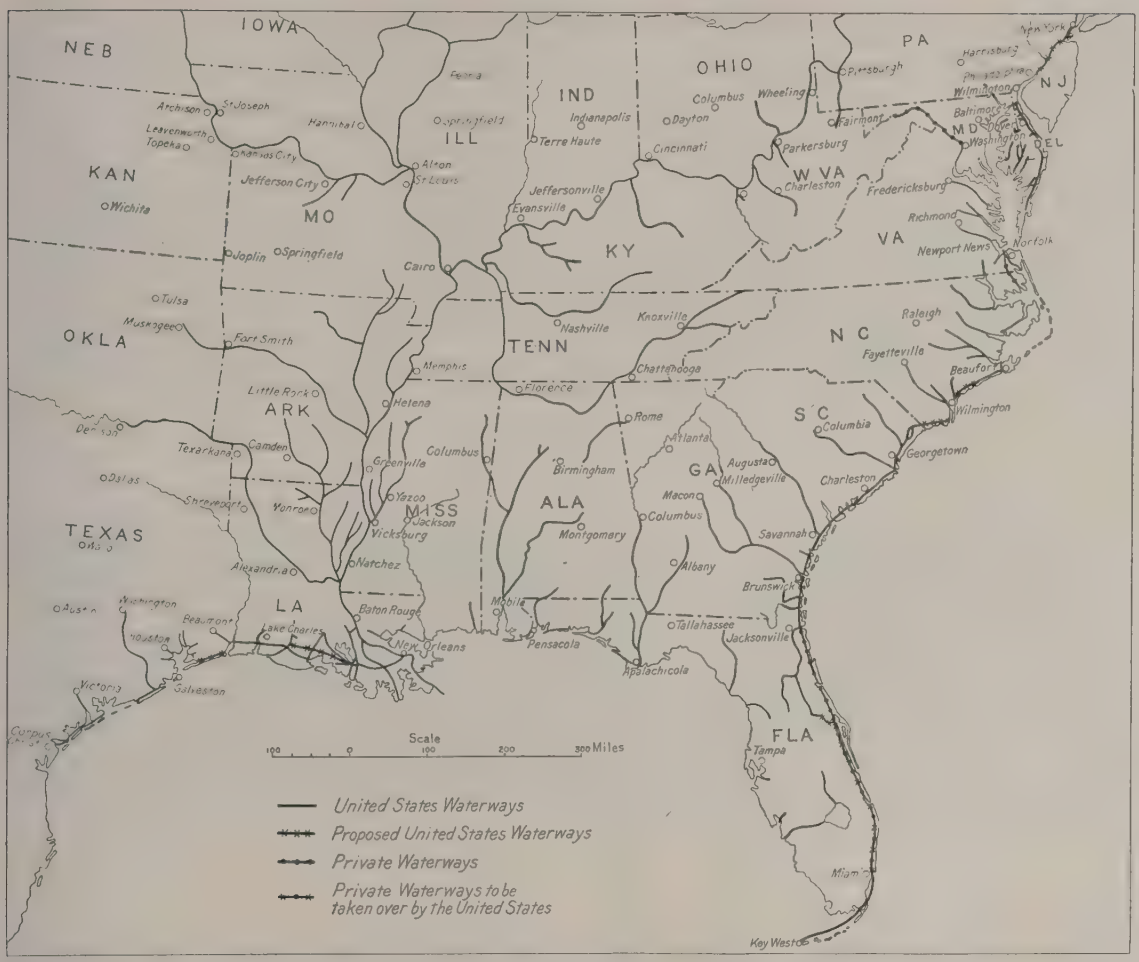
Arrival of Steamboats at St. Louis and New Orleans

Year	St. Louis	New Orleans
1819	*	191
1829	*	756
1839	1,476	1,551
1849	2,905	2,873
1859	3,149	3,259

*Statistics unavailable.

The Civil War practically destroyed the river trade and it has never been restored to its former volume. The devastation wrought by the war would have delayed the restoration of river traffic in any event, but another cause was at work, less sudden in its effects than war but equally potent and more permanent. In 1830 locomotives began to run on two little roads, both in the South, one, thirteen miles long, starting at Baltimore, the other, only six miles in length, beginning at Charleston. This was the birth of the steam railway and the beginning of far-reaching and revolutionary changes, not only in the field of transportation but in practically every phase of human activity.

The first railways were short lines connecting interior communities with cities located upon harbors or rivers. For a time it seemed that they would simply supplement



MAP OF THE NAVIGABLE WATERWAYS OF THE SOUTH COMPILED FROM THE PUBLICATIONS OF THE UNITED STATES ARMY ENGINEERS

the waterways, but it was not long before co-operation was replaced by competition. The war between rail and river for the traffic of a territory imperial in extent and resources was well under way before the Civil War began. The roads north of the Ohio diverted to the East the trade of a vast territory that had been going down the rivers to the Gulf. In the South, all the seaports on the Atlantic, and some of those on the Gulf as well, used every effort to send into the interior those magic lines of rails which could wrest the traffic from the rivers and bring it to their wharves; so the commerce of the ports increased while that of the rivers dwindled away.

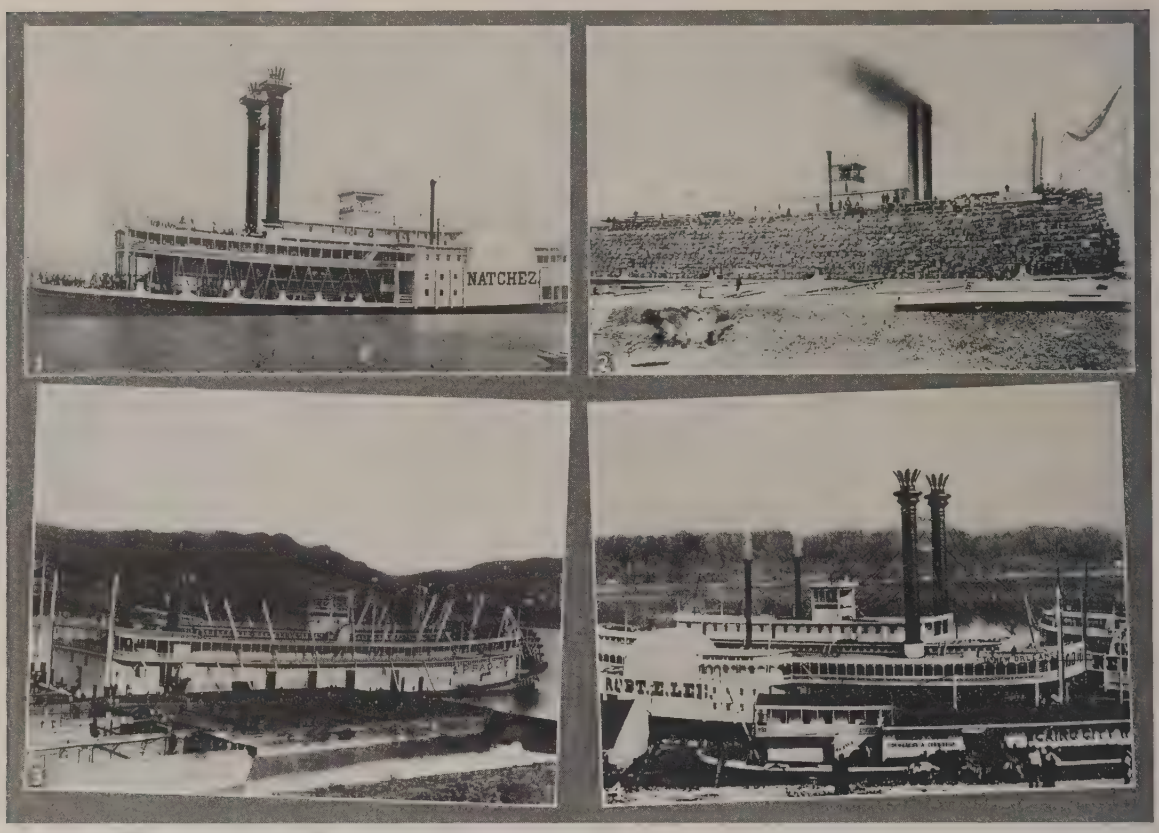
As railway lines were multiplied, some of them fought each other part of the time, but all of them fought the waterways all of the time. In language admirable in its restraint, the report of the Inland Waterways Commission, published in 1908, said:

"While the decline of navigation on the inland waterways was largely due to the natural growth and legitimate competition attending railway extension, it is also clear that railway interests have been successfully directed against the normal maintenance and development of water traffic by control of waterfronts and terminals, by acquisition or control of competing canals and vessels, by discriminating tariffs, by rebates, by adverse placement of tracks and structures, and by other means."

The passenger traffic was the first to go. Because trains travel faster than boats, passengers deserted the rivers for the rails whenever the two came into competition. With the loss of its passenger traffic it became necessary to replace the "packet boat" with some less expensive method of carrying freight. This was found in the use of fleets of barges controlled by towboats, a method that reached its highest development in the transportation of coal on the Ohio and Mississippi rivers. The great Appalachian coal field is intersected by a number of navigable rivers, and the shipment of coal in drifting flatboats began as early as 1840. The use of towboats in the coal trade began in a limited way before the Civil War and was greatly increased after its close. For many years coal constituted the principal—indeed, almost the only—traffic on the lower Mississippi.

It is interesting to note that the greatest cargo ever moved in the history of transportation was not handled on the Great Lakes or the ocean, but on the Ohio and Mississippi rivers, when the "Sprague" took 56,000 tons of coal from Louisville to New Orleans. Cargoes of 35,000 to 40,000 tons were common and hundreds of thousands of tons went down on every "coal boat rise."

In the struggle between the two methods of transportation individual boat lines were crushed, boats disappeared entirely from some rivers and by 1880 the steamboat had



1 and 4. Types of Old-Time Mississippi River Boats, "Natchez" and "Robert E. Lee." 2. Largest Cargo of Cotton Ever Handled on the Mississippi River, 9226 Bales and 250 Tons Miscellaneous Freight on Steamer "Henry Frank." 3. The "Sprague," a Towboat on Mississippi River Which Has Handled Over 56,000 Tons Coal at One Time

been dethroned and relegated to a secondary position. However, neither "legitimate competition" nor "other methods" have been able to destroy it completely. The advocates of water transportation—nowhere more numerous or more steadfast than in the South—while often defeated, have never been conquered. Insistently, consistently and persistently they have worked for the appropriations needed to give the waterways unobstructed and dependable channels—and their work has not been in vain.

The early navigators met as best they could the difficulties and dangers—which were multiplied at times of low

Modern Type of Fine Passenger River Steamer

water—caused by rocks, rapids, snags and sandbars. The desire for river improvement by the Government, which arose in the flatboat days, grew ever stronger as the number of steamboats increased. The first appropriation made by Congress for any waterway was $30,000 voted in 1802 for the Delaware River. An appropriation of $5000 was made in 1820 for surveys and one of $75,000 in 1824 for improvement of the Mississippi and Ohio rivers, being the first for any waterway west of the Alleghenies. The first appropriations for Southern harbors were made in 1826—$50,000 for Savannah harbor and $10,000 for Mobile harbor, bay and river.

Government Barge Line on Mississippi River of the Inland Waterways Corporation

Expenditures on Southern Waterway Projects, Mileage, Tonnage and Value of Commerce for Calendar Year 1922

Name of Project	Expenditures to June 30, 1923			Traffic, Calendar Year 1922		
	New Work	Maintenance	‡Total	Mileage	Tonnage	Value
*Chesapeake and Delaware Canal	$3,244,713	.....	$3,244,713	17.9	797,390	$48,358,613
*Waterway, Chincoteague Bay to Delaware Bay	168,411	$31,831	200,243	70.	34,692	2,495,217
*Waterway on Coast of Virginia	9,404	6,211	15,616	7.	13,867	453,635
Baltimore Harbor and Channels	9,500,986	618,239	10,119,225	16.5	13,195,626	587,322,924
*Susquehanna River	270,664	44,255	314,920	5.5	95,467	959,900
*Elk and Little Elk Rivers	85,685	44,342	130,028	16.	42,451	254,706
*Chester River	55,700	20,773	76,474	39.25	27,168	1,132,991
*Corsica River	39,070	1,697	40,768	5.	7,958	124,474
Queenstown Harbor	44,858	18,999	63,858	1.	768	158,613
Claiborne Harbor	29,873	29,873	59,747	0.5	10,679	1,417,222
Tilghman Island Harbor	29	.....	29	0.25	4,052	539,787
*Tred Avon River	12,692	1,140	13,833	10.4	13,299	1,065,187
*Trappe River	8,063	15,967	24,031	3.	4,221	119,898
*Choptank River	78,996	21,649	100,646	46.	14,047	1,588,277
*Tuckahoe River	9,727	1,092	10,820	9.25	.....	.....
*Warwick River	22,040	24,641	46,681	1.5	2,278	334,883
Cambridge Harbor	61,321	6,087	67,408	0.75	46,120	1,788,492
*Slaughter Creek	4,140	500	4,640	8.	8,539	769,031
*Nanticoke River (incl. N. W. Fork)	48,815	26,974	75,790	53.	43,115	1,858,890
*Broad Creek River	64,520	13,614	78,134	7.	29,056	565,698
*Tyaskin Creek	16,296	18,266	34,563	0.7	1,013	206,513
*Wicomico River	116,333	40,289	156,622	23.	90,428	3,848,654
*Lower thoroughfare, near Wenona, Delaware	12,200	700	12,900	0.5	10,192	455,181
Crisfield Harbor	87,740	2,839	90,579	2.	167,795	4,998,449
*Broad Creek	28,227	3,321	31,548	2.	11,096	515,275
*Pocomoke River	34,500	8,210	42,710	28.33	11,257	784,177
*Twitch Cove and Big Thoroughfare River	2,900	500	3,400	4.	12,104	1,430,703
*Tangier Channel	15,627	.....	15,627	1.	21,937	1,876,073
*Potomac River:						
*At Washington	2,795,306	827,424	3,622,731	110.	1,090,798	12,446,085
*At Alexandria	95,214	19,598	114,812	.....	113,495	4,067,488
*Anacostia River	1,577,748	.....	1,577,748	6.33	309,628	65,980,195
*Occoquan Creek	69,427	47,478	116,905	6.	44,253	196,520
*Aquia Creek	52,464	4,250	56,714	6.	.....	.....
*Rappahannock River	414,633	266,885	681,518	108.	140,323	7,507,349
*Urbanna Creek	38,811	30,088	68,900	1.	7,232	885,730
*Mattaponi River	54,899	67,688	122,588	41.	54,688	702,820
*Pamunkey River	39,666	43,387	83,053	50.	57,768	524,208
Norfolk Harbor and Channels	6,259,769	154,978	6,414,748	45.25	14,371,211	560,066,693
*Thimble Shoal Channel	1,863,873	15,976	1,879,849	.....	.....	.....
Newport News	1,032,515	102,620	1,135,135	10.	3,198,164	30,001,907
James River	3,148,005	159,535	3,307,541	103.8	639,217	51,085,691
Appomattox River	769,384	191,826	961,210	11.	211,211	7,152,483
*Pagan River	51,425	25,154	76,579	6.66	26,224	1,598,305
*Nansemond River	72,677	31,127	103,804	18.	50,116	650,225
*Onancock River	33,549	24,584	58,133	5.	21,037	1,107,885
*Waterway, Norfolk to Sounds of North Carolina	251,196	259,016	510,212	46.3	104,812	2,731,096
*Waterway, Norfolk to Beaufort Inlet, North Carolina	4,643,052	56,404	4,699,456	201.5	425,548	10,894,999
*Blackwater River	16,144	5,673	21,817	13.	5,110	517,250
*Meherrin River	6,517	6,268	12,785	12.	6,033	612,990
Roanoke River	227,074	18,165	245,239	129.	76,425	793,171
Newbegun Creek	4,802	79	4,881	4.5	2,183	99,520
Scuppernong River	42,675	13,061	55,737	26.	21,608	476,784
Manteo Bay	10,503	13,246	23,750	1.	12,998	1,140,503
*Waterway, Swan Quarter to Deep Bay	8,550	9,113	17,664	1.	4,116	322,579
Pamlico and Tar Rivers	301,680	95,199	396,880	87.	131,961	4,364,376
Fishing Creek	22,715	8,632	31,347	40.	.....	.....
South River	12,452	3,547	16,000	10.5	8,896	334,342
Bay River	22,729	4,170	26,900	17.	6,522	340,372
Neuse River	369,399	111,979	481,379	150.	217,296	6,142,992
Smiths Creek	14,471	254	14,726	4.	21,895	223,172
Swift Creek	1,600	3,098	4,698	12.	3,182	112,916
Contentnea Creek	64,394	26,245	90,640	63.	1,120	39,200
Trent River	110,316	43,231	153,548	38.	12,150	381,348
Thoroughfare Bay to Cedar Bay	12,000	.....	12,000	1.5	6,741	81,425
Beaufort Harbor	197,741	106,224	303,965	5.	27,700	1,180,017
Beaufort Harbor to Core Sound	20,000	12,853	32,853	2.75	20,026	1,200,711
*Beaufort to Jacksonville, North Carolina	198,706	92,752	291,459	70.	47,964	1,124,007
Morehead City Harbor	20,291	13,608	33,900	.....	10,348	1,048,698
*Beaufort Inlet	44,484	79,324	123,808	2.25	45,911	896,998
Harbor of Refuge, Cape Lookout	1,363,798	24,824	1,388,623	.....	.....	.....
Cape Fear River:						
*At and Below Wilmington	5,128,272	2,140,658	7,268,930	30.	667,540	57,251,120
Above Wilmington	1,248,200	142,108	1,390,309	115.	64,552	3,844,709
Northeast (Cape Fear) River	10,687	36,597	47,285	103.	105,916	4,437,667
Black River	12,358	25,584	37,943	66.	3,180	417,405
*Shallotte River	11,407	2,537	13,945	8.	4,112	335,530
Winyah Bay	2,889,563	476,044	3,365,607	15.	409,843	16,363,891
Waccamaw River, North Carolina and South Carolina	246,803	76,380	323,184	142.	67,095	519,584
Great Peedee River	183,712	131,643	315,356	164.	13,725	141,173
Santee and Congaree Rivers and Estherville-Mimim Creek Canal	274,369	131,438	405,808	152.	15,704	169,704
Congaree River	364,623	442,402	807,025	51.	5,830	13,580
*Charleston to Winyah Bay	210,768	58,664	269,433	83.	23,536	359,568
Charleston Harbor	6,568,210	142,621	6,710,831	20.	1,500,385	109,129,689
*Ashley River	56,650	21,118	77,768	7.25	.....	.....
*Wappoo Cut	59,489	19,984	79,473	3.25	26,025	908,536
Savannah Harbor	10,282,678	4,077,166	14,359,845	27.5	2,017,298	407,611,863
Savannah River:						
Below Augusta	739,046	367,225	1,106,272	201.	95,983	3,090,464
At Augusta	200,556	15,848	216,405	.....	.....	.....
Above Augusta	69,599	3,870	73,470	53.	.....	.....
*Beaufort Inlet, South Carolina, to St. Johns River, Florida	633,691	441,500	1,075,192	225.	291,800	7,619,900
Sapelo Harbor	17,905	16,157	34,062	18.	18,968	343,000
Darien Harbor	144,793	41,794	186,587	12.	47,457	1,191,800
*Fancy Bluff Creek	8,000	3,000	11,000	4.5	4,275	222,100
*Satilla River	9,451	10,305	19,757	114.	31,045	1,074,600
*St. Marys River, Georgia and Florida	15,688	34,302	49,991	65.	17,476	451,800
Altamaha River	168,813	121,812	290,626	144.	85,910	1,957,900
Oconee River	224,634	130,402	355,037	162.	66,732	1,453,200
Ocmulgee River	433,804	184,944	618,748	205.	22,213	1,352,880
Brunswick Harbor	1,516,101	721,620	2,238,022	7.	777,251	20,953,000
Flint River	409,011	129,030	538,042	103.	22,612	1,462,518
Chattahoochee River, Georgia and Alabama	892,218	642,324	1,534,573	164.	66,077	2,772,857
Fernandina Harbor	3,142,437	502,868	3,645,306	2.	206,089	3,811,700
St. Johns River:						
*Jacksonville to Ocean	6,675,767	2,475,780	9,151,548	28.	2,350,126	115,242,299
Jacksonville to Palatka	205,698	60,915	266,613	55.	258,566	7,249,830
Palatka to Lake Harney	182,165	92,687	274,853	115.	160,598	4,856,135
Lake Crescent and Dunns Creek	10,276	5,723	16,000	15.25	11,098	524,867
Oklawaha River	39,925	70,704	110,629	94.	5,772	69,277

Expenditures on Southern Waterway Projects, Mileage, Tonnage and Value of Commerce for Calendar Year 1922, Continued

Name of Project	Expenditures to June 30, 1923			Traffic, Calendar Year 1922		
	New Work	Maintenance	‡Total	Mileage	Tonnage	Value
*Indian River	$83,493	$143,203	$226,696	77.	12,500	$1,260,852
*St. Lucie Inlet	23,493	.....	23,493	.....	1,800	196,244
Miami Harbor	1,015,092	109,823	1,124,916	19.	206,280	8,349,376
Key West Harbor	927,094	107,175	1,034,270	2.	890,931	85,882,226
Kissimmee River	23,479	21,956	45,435	146.4	4,458	251,180
*Caloosahatchee River	146,952	105,069	252 022	63.	45,464	2,662,742
*Orange River	2,000	6,100	8,100	5.7	1,670	116,054
Charlotte Harbor	121,578	28,218	149,797	24.	351,403	2,299,476
Sarasota Bay	240,113	49,688	289,802	38.	10,036	1,015,914
Clearwater Harbor and Boca Ceiga Bay	105,877	26,148	132,025	26.	2,383	148,712
*Anclote River	51,651	23,229	74,881	4.5	7,768	1,435,565
*Crystal River	25,000	9,000	34,000	9.	110	11,013
*Withlacoochee River	315,085	22,176	337,261	85.	2,738	74,200
Suwannee River	76,417	9,394	85,812	135.	21,216	66,649
Tampa Harbor	4,509,012	364,299	4,873,312	50.	2,487,105	45,247 237
*Manatee River	123,349	81,702	205,052	24.66	37,410	1,209,083
St. Petersburg Harbor	32,688	18,435	51,124	9.	35,471	3,125,328
Removing water hyacinth	.....	181,548	181,548	.....	.....	.....
Carrabelle Bar and Harbor	79,057	127,308	206,365	6.	10,361	838,150
Apalachicola Bay	216,758	378,152	594,910	14.	30,736	1,943,879
Apalachicola and Lower Chipola Rivers	109,007	97,777	206,784	122.8	103,964	3,871,380
Upper Chipola River (to Marianna)	36,781	26,324	63,105	55.	5,173	536,305
Apalachicola River to St. Andrews Bay	505,930	54,947	560,877	36.5	5,816	160,084
Entrance to St. Josephs Bay	20,105	394	20,500	14.	51,897	967,933
St. Andrews Bay	203,560	226,914	430,474	17.	132,306	3,796,052
Choctawhatchee River, Florida and Alabama	171,884	156,566	328,450	138.	91,418	1,039,069
Holmes River	8,562	31,510	40,072	25.	4,350	135,896
*Narrows in Santa Rosa Sound	22,525	10,920	33,446	31.	109,053	2,199,060
Blackwater River	41,649	30,058	71,708	10.	20,858	1,102,200
Escambia and Conecuh Rivers	118,336	79,137	197,474	147.	10,660	122,030
Pensacola Harbor	946,398	547,400	1,493,798	13.	974,037	25,157,843
*La Grange Bayou	.....	2,160	2,160	2.	12,831	986,690
Coosa River	2,571,616	542,007	3,113,924	176.5	13,398	150,227
Alabama River	948,773	657,800	1,606,573	311.	37,307	933,868
Mobile Harbor	6,853,116	2,556,330	9,409,446	40.	1,582,311	84,977,824
Mobile Bay to Mississippi Sound	45,604	31,466	77,070	4.	97,128	3,890,751
Black Warrior, Warrior and Tombigbee Rivers	10,157,514	3,222,403	13,379,917	459.5	973,419	17,013,074
Tombigbee River:						
Mouth to Demopolis	199,542	313,838	513,380	185.	656,638	17,832,956
Demopolis to Walkers Bridge	197,650	214,045	411,696	318.	32,041	147,715
Pascagoula Harbor	1,024,394	759,313	1,783,708	22.7	321,313	2,480,272
Gulfport Harbor and Ship Island Pass	258,031	1,454,800	1,712,832	9.	352,146	6,856,818
Pascagoula River	15,000	96,068	111,068	82.1	116,935	800,667
Biloxi Harbor	44,382	63,303	107,685	1.25	91,916	689,189
*Wolf and Jordan Rivers	29,195	27,267	56,463	3.6	3,359	66,435
*East Pearl River	37,127	22,138	59,266	1.3	136,987	1,668,064
Removing water hyacinth	.....	7,956	7,956	.....	.....	.....
*Southwest Pass	14,032,277	4,383,303	18,415,580	19.8	12,863,999	617,565,331
*South Pass Channel	8,000,000	4,214,577	12,214,577	.....	.....	.....
Lake Ponchartrain	56,372	1,766	58,138	40.	465,714	4,199,656
Chefuncte River and Bogue Falia	24,563	22,933	47,496	14.5	81,974	1,289,818
Pass Manchac	1,374	2,684	4,058	7.	31,096	1,923,434
Pickfaw, Natalbany, Ponchatoula and Blood Rivers	8,115	16,979	25,095	45.5	41,126	354,656
Amite River and Bayou Manchac	24,900	49,243	74,143	110.	20,103	409,879
Barataria Bay	8,163	.....	8,163	39.95	170,596	8,059,798
Bayou Lafourche	252,935	15,362	268,298	107.	171,622	5,101,169
Bayou Terrebonne	120,088	2,571	122,660	24.11	161,381	6,377,039
Bayou Plaquemine, Grand River and Pigeon Bayous, Louisiana	1,844,035	246,795	2,090,830	90.	538,776	13,359,401
Bayou Grossetete	29,392	6,602	35,995	29.	162,927	1,403,757
Bayou Teche	558,803	107,101	665,905	106.5	601,562	3,860,184
Plaquemine Lock	.....	340,083	340,083	.....	171,798	6,327,521
Keystone Lock, Bayou Teche	.....	39,266	39,266	.....	4,356	312,323
Atchafalaya River, Morgan City to Gulf	501,963	152,472	654,435	40.	594,759	3,507,877
Intracoastal Waterway:						
Mississippi River to Bayou Teche	87,429	.....	87,429	115.	12,071	171,945
Franklin to Mermentau	176,314	65,492	241,807	93.7	4,008	376,054
Vermilion River to Schooner Bayou	37,500	.....	37,500	4.	.....	.....
Mermentau River to Calcasieu River	279,288	285	279,574	37.67	.....	.....
Calcasieu River to Sabine River	308,162	8,827	316,990	24.8	22,627	1,141,216
Schooner Bayou Lock	.....	53,850	53,850	.....	4,008	376,054
Bayou Vermilion	34,900	82,315	117,215	51.	33,527	415,934
Mormentau River, Bayou Nezpique and Bayou des Cannes	27,580	19,152	46,733	105.	12,562	459,866
Bayou Queue de Tortue	33,355	4,262	37,617	14.	1,087	25,536
Bayou Plaquemine Brule	32,759	7,240	40,000	19.	2,244	28,848
Calcasieu River and Pass	495,813	171,381	667,294	97.	225,421	1,903,604
Removing water hyacinth	.....	406,468	406,468	.....	.....	.....
*Sabine-Neches Waterway	6,286,387	2,957,251	9,243,639	63.	.....	.....
*Sabine Pass	.....	.....	.....	.....	1,474,411	25,723,093
*Port Arthur Canal	.....	.....	.....	.....	7,736,708	182,098,512
*Sabine River	.....	.....	.....	.....	419,632	9,544,353
*Neches River	.....	.....	.....	.....	2,359,082	48,955,409
*Sabine Neches Canal	.....	.....	.....	.....	238,318	1,014,894
Galveston Harbor	10,863,077	1,078,295	11,941,372	6.	10,230,565	815,066,009
Galveston Channel	2,368,354	1,230,327	3,598,681	5.	5,356,831	624,415,989
*Galveston to Texas City	1,550,816	1,140,058	2,690,904	7.	3,268,201	36,273,562
Johnsons Bayou, Louisiana	2,261	20,617	22,878	5.5	10,120	1,346,598
*Channel to Port Bolivar	133,924	326,918	460,843	4.	308,715	19,639,875
*Houston Ship Channel	5,886,576	2,056,323	7,942,899	57.	3,365,644	163,887,754
*East Bay Bayou	2,476	847	3,323	0.25	.....	.....
*Double Bayou	6,953	50,778	57,731	20.5	6,387	622,196
*Anahuac Channel	5,975	56,442	62,417	3.	35,701	795,022
*Turtle Bayou	8,899	30,523	39,423	14.5	25,438	335,051
*Mouth of Trinity River	79,540	10,870	90,411	.....	27,672	426,186
Trinity River	1,896,086	547,033	2,443,119	41.4	.....	.....
*Cedar Bayou	39,087	18,344	57,432	17.	6,480	312,420
*Clear Creek	14,290	36,216	50,507	20.	872	12,126
*Dickinson Bayou	6,287	31,555	37,842	25.	.....	.....
*Chocolate Bayou	6,512	33,248	39,760	33.	99	2,048
*Bastrop Bayou	9,920	14,578	24,498	30.	.....	.....
*Oyster Creek	6,942	7,556	14,498	24.	.....	.....
Freeport Harbor	729,061	806,071	1,535,132	6.5	366,749	2,404,810
Brazos River:						
Velasco to Old Washington	216,989	223,010	440,000	247.5	.....	.....
Old Washington to Waco	1,440,634	113,953	1,554,587	176.	.....	.....
*W. Galveston Bay and Brazos River Canal	233,594	237,489	471,084	36.	615	246,615
*Brazos River to Matagorda Bay	251,549	336,365	587,914	32.	36,172	247,552
*Pass Vavallo to Aransas Pass	49,017	187,232	236,249	63.	31,550	298,132
*Aransas Pass to Corpus Christi	280,455	71,460	351,915	21.5	1,609	92,904
*Pass Cavallo to Port Lavaca	9,699	5,282	14,982	26.	1,279	25,876
*Guadelupe River to Victoria	172,547	106,100	278,647	68.	17,655	38,559

EXPENDITURES ON SOUTHERN WATERWAY PROJECTS, MILEAGE, TONNAGE AND VALUE OF COMMERCE FOR CALENDAR YEAR 1922, CONTINUED

NAME OF PROJECT	EXPENDITURES TO JUNE 30, 1923			TRAFFIC, CALENDAR YEAR 1922		
	NEW WORK	MAINTENANCE	‡TOTAL	MILEAGE	TONNAGE	VALUE
Port Aransas	$3,361,594	$1,293,907	$4,655,502	8.	94,386	$456,135
Brazos Island Harbor	248,465	.....	248,465	3.	.....	.....
Red River, Fulton to mouth of Washita River	378,573	182,157	560,730	292.	57	19,169
Cypress Bayou and Waterway between Jefferson Texas, and Shreveport, Louisiana	202,817	114,647	317,464	66.	9,294	403,337
Red River below Fulton	1,963,806	1,068,282	3,032,089	475.	6,668	905,050
Ouachita and Black Rivers	4,814,375	1,006,079	5,820,454	360.	153,931	2,918,550
Tensas River and Bayou Macon	35,862	58,637	94,500	250.	70,694	1,161,335
Boeuf River	30,000	77,234	107,234	166.	1,527	122,150
Bayou Bartholomew	45,873	39,986	85,860	182.	.....	.....
Saline River	26,900	11,431	38,331	135.	.....	.....
Bayous D'Arbonne and Corney	19,000	30,612	49,612	57.	1,653	76,855
Yazoo River	259,660	204,939	564,600	178.	218,819	7,086,935
Tallahatchie and Coldwater Rivers	43,481	135,378	178,860	155.	3,423	1,013,104
Big Sunflower River	560,026	206,637	766,664	171.4	55,516	2,611,913
Big Sunflower Lock and Dam	34,347	33,842	68,189	.....	1,698	259,069
Steele and Washington Bayous and Lake Washington, Mississippi	12,500	14,549	27,049	60.	9,200	112,000
Mouth of Yazoo River	1,179,210	78,873	1,258,084	9.3	143,758	5,340,011
Arkansas River	1,018,511	2,954,533	3,973,045	465.	27,026	138,355
White River at Augusta Narrows	25,800	24,820	50,620	.....	.....	.....
White River	326,801	327,326	654,128	301.	141,733	890,524
Black River	80,000	249,021	329,021	213.	86,591	375,404
Current River	17,000	80,414	97,414	94.	15,323	92,197
St. Francis River, L'Anguille River and Blackfish Bayou, Arkansas	92,000	114,392	206,392	174.	237,206	1,168,685
Upper White River Locks	813,196	624,430	1,437,627	.....	1,744	24,950
Mississippi River, between Ohio and Missouri River Removing snags	11,450,271	9,129,845	20,580,117	200.	548,114	43,193,152
	.....	4,141,408	4,141,408	.....	.....	.....
Mississippi River, between Missouri River and Minneapolis	33,007,129	401,000	33,408,129	170.	818,059	11,259,607
Operating snag boats on Upper Mississippi	.....	1,376,494	1,376,494	.....	.....	.....
Missouri River, Kansas City to mouth	14,679,348	3,142,957	17,822,306	606.	176,550	301,635
Osage River	668,774	539,899	1,208,674	109.	58,553	311,452
Gasconade River	143,186	81,075	224,261	62.	5,527	52,937
Cumberland River:						
Below Nashville	4,418,235	49,933	4,468,168	518.7	101,093	3,781,404
Above Nashville	3,645,845	90,657	3,736,502	.....	287,607	4,005,238
Operating and care locks and dams	.....	1,231,593	1,231,593	.....	.....	.....
Tennessee River:						
Below Riverton	1,433,412	123,725	1,557,137	652.	267,507	5,824,779
Above Chattanooga	2,350,128	110,062	2,460,190		619,124	2,430,270
Chattanooga to Browns Island	2,013,304	181,311	2,194,615		165,486	12,564,455
French Broad and Little Pigeon Rivers	209,604	33,554	243,158	70.5	1,542	55,696
Clinch River	53,949	7,873	61,822	126.2	7,589	82,217
Hiwassee River	113,311	9,754	123,065	35.	2,386	280,561
Tennessee River, Browns Island to Riverton	1,073,104	12,500	1,085,604	.....	.....	.....
Muscle Shoals Canal	3,191,726	1,730,716	4,922,442	.....	3,446	802,290
Colbert Shoals Canal	.....	212,883	212,883	.....	44,230	1,159,016
Dam No. 2 Muscle Shoals	19,786,122	359,592	20,145,715	.....	.....	.....
Ohio River:						
Locks and Dams	70,823,562	.....	70,823,562	968.5	.....	.....
Open Channel Work	6,747,937	3,383,582	10,131,520			
Operating and Care	.....	11,880,612	11,880,612			
Operating Snag Boats	.....	1,116,728	1,116,728	.....	.....	.....
Monongahela River	8,088,120	741	8,088,862	130.	14,407,129	102,001,757
Monongahela River, operating and care	.....	12,097,956	12,097,956	.....	.....	.....
Little Kanawha River	259,082	338,558	597,640	48.	47,290	4,608,532
Little Kanawha River—old project	288,699	904	289,604	.....	.....	.....
Kanawha River	4,298,041	2,606,546	6,904,588	90.	942,451	8,746,201
Big Sandy River and Levisa and Tug Forks, West Virginia and Kentucky	1,584,736	604,247	2,188,983	76.	59,573	904,165
Kentucky River	4,175,639	4,335,892	8,511,531	280.	296,381	3,927,316
Green and Barren Rivers	670,428	2,737,964	3,408,392	225.5	294,209	6,956,538
Rough River	105,500	38,417	143,917	29.5	6,314	65,986
Mississippi River, Cairo to head of Passes	98,123,721	32,805,888	130,929,609	1,065.	.....	.....
Cairo to Memphis	.....	.....	.....	.....	923,386	87,351,709
Memphis to Vicksburg	.....	.....	.....	.....	1,441,048	132,422,779
Vicksburg to New Orleans	.....	.....	.....	.....	†5,289,286	†184,173,361
Total for Rivers	‡$340,127,332	‡$114,328,883	‡$454,456,215	6,746.03	35,400,700	$840,575,252
Total for Harbors	‡$144,902,658	‡$42,738,771	‡$187,641,429	2,415.68	100,056,924	$4,970,046,125
GRAND TOTAL	‡$485,029,990	‡$157,067,654	‡$642,097,644	9,161.71	135,457,624	$5,810,621,377

* Waterways so marked are classified as harbors because used wholly or chiefly as such.
† Includes petroleum and its products transported above New Orleans in vessels traversing the Passes.
‡ Totals include the cents omitted in separate items.

There is published herewith a table, compiled from reports of the Chief of Engineers, United States Army, showing the amounts expended up to June 30, 1923, for new work, maintenance and total, on each of the Southern rivers and harbors which are now being improved or maintained by the Government. The grand total is $642,097,644.

Appropriations were also made of $3,317,779 for projects which have been abandoned, $1,680,000 for canals (Chesapeake and Ohio, $1,000,000; Delaware and Chesapeake, $450,000; Dismal Swamp, $230,000) and $65,400 for surveys—presumably for projects not undertaken. Adding these amounts, we get a final total of $647,160,823. (This includes the entire expenditures on the Upper Mississippi and Monongahela rivers, since there is no way to determine how much should be assigned to the South. It also includes the total expenditures on the Lower Mississippi River and on the Wilson Dam in the Tennessee River, a portion of which belongs, in the one case, to flood protection, and in the other to hydro-power production).

The total amount appropriated by Congress for rivers and harbors up to June 30, 1923, was $1,233,825,256, but the total amount actually expended was approximately $64,000,000 less, or, in round numbers, $1,170,000,000—from which it appears that the Government has spent $644,160,823 on the rivers and harbors of the South and $522,839,177 on all the rest. This does not mean, however, that the South has received an undue share of the total. Senator Fletcher of Florida once said: "If you want to improve rivers, you must go where the rivers are"—and the South, with less than a third of the area, has nearly three-fourths of the navigable waterways of the country.

In addition to the amount provided by the Government, a large sum has been expended on the waterways of the South from contributions made by local interests, ranging from counties and cities to individuals. More than $11,500,000 has been contributed for levee building on the

Handling Freight at a Memphis Terminal Designed to Meet Varying Levels of Water

Mississippi since the passage of the Flood Control Act in 1917, and the late Congressman Humphries of Mississippi —a recognized authority on the subject—stated that the contributions voluntarily made for the same purpose before that date amounted to $70,000,000.

Three Texas cities have contributed, respectively—Houston, $2,744,000 toward the cost of its ship channel; Beaumont, $512,000 for the improvement of the Neches River, and Orange, $235,000 for that of the Sabine. Calcasieu parish, Louisiana, has contributed some $300,000 toward the Intracoastal Canal, and Lake Charles, chief city of that parish, has voted $2,750,000 of bonds to make the 37-mile section between that city and the Sabine River 30 feet deep. A Government report published in 1909 listed 160 miles of abandoned canals in the South which were built at a cost of $13,228,504. These are simply illustrative instances. No complete tabulation of Southern contributions to waterways has ever been published.

Many causes have contributed to the gradual restoration of traffic on the rivers which has taken place during the past twenty or twenty-five years—the better channels furnished by the work of the Army Engineers; beneficial legislation; the oft-repeated, long-continued car shortages which, as in 1907, so disastrously demonstrated the inability of the railroads alone to meet all the traffic needs of the country, and the tremendous demand for increased transportation facilities created by the World War. The growth of population and the general development of the country necessarily produced a corresponding increase in the commerce of Southern ports.

The table already referred to gives for each Southern waterway and harbor the tonnage and the value of the commerce carried thereon in the calendar year 1922. Certain rivers and creeks, indicated by an asterisk, are

VERTICAL LIFT TYPE MUNICIPAL TERMINAL AT ST. LOUIS

included with the harbors because, in spite of their names, they are used, entirely or mainly, as harbors. Taking rivers and harbors together—and there is no hard and fast line separating them—there were 84 which handled a traffic of more than 100,000 tons. Of these, 21 handled more than 1,000,000 tons and 4 over 10,000,000 tons. Taking value of commerce instead of tonnage, we find: over $1,000,000, 124; over $10,000,000, 36; over $100,000,000, 11, and over $500,000,000, 4.

Adding together the items in the table, we get the following:

COMMERCE OF SOUTHERN WATERWAYS

(Calendar Year 1922)

	Tonnage	Value
Rivers	35,400,700	$840,575,252
Harbors	100,056,924	4,970,046,125
Totals	135,457,624	$5,810,621,377

It must be clearly understood, however, that these totals represent the aggregate of the separate items and not the amount and value of the tonnage actually handled, because there are many duplications. Traffic carried between two Southern ports is reported once when shipped and again on arrival. Statistics on the Mississippi are gathered, not for the whole river but for several sections, and some commerce is reported two or more times. It is believed that these figures require reduction by about one-third in order to eliminate the duplications.

How the leading ports of the South stand in relation both to each other and to the principal ports of the United States is shown in the following table, and only those ports are included whose commerce exceeded 10,000,000 tons in volume or $500,000,000 in value, the Monongahela interpolated as being the only one in the country with a traffic in excess of 10,000,000 tons:

COMMERCE OF PRINCIPAL UNITED STATES PORTS CALENDAR YEAR 1922

I. Tonnage

New York	49,867,669
Duluth—Superior	38,202,074
Philadelphia	26,650,505
Buffalo	18,546,888
San Francisco	14,837,609
(Monongahela River	14,407,129)
Norfolk	14,371,211
Boston	13,993,646
Baltimore	13,195,626
Chicago	12,537,676
Ashtabula	11,991,667
Cleveland	10,925,692
Los Angeles	10,285,810
New Orleans	10,109,513

II. Value

New York	$6,032,089,900
San Francisco	1,169,312,045
Philadelphia	1,062,641,412
Boston	674,603,665
Galveston	624,445,989
New Orleans	623,183,889
Baltimore	587,322,924
Buffalo	578,634,684
Norfolk	560,066,693

The facts and figures already presented give at least a faint indication of the importance, both past and present, of the waterways and harbors of the South. What of the future?

The service thus far performed, important and impressive as it is, has been rendered by waterways which, with a very few exceptions, are still far from finished. The existing plan for the improvement of the James River

Tow of Jones & Laughlin Steel Company's Products in Lock on Ohio River

was adopted by Congress July 5, 1884, and the Army Engineers report that the project was about 50 per cent completed on June 30, 1923! It is worth while to glance at what can be done on waterways which have channels with dependable depths.

Ohio River Barges of the Standard Oil Co. on the Kanawha River at Charleston, W. Va.

The Great Lakes themselves have ample depth to accommodate any ship afloat, but not every one knows that, in its original condition, the controlling depth over the bars at the outlet of Lake St. Clair was only from 2 to 6 feet, while the rapids at the mouth of Lake Superior were entirely impassable. Now, although they are blocked by ice for between four and five months of the

Tow of Carnegie Steel Company Entering Locks of the Canal at Louisville

year, the commerce handled on the Lakes amounts to from 115,000,000 to 125,000,000 tons annually.

The Monongahela is improved by means of locks and dams for 131 miles, the depth on the sills of the locks being only 7 feet as compared to a normal depth of 20 feet in the connecting channels of the Great Lakes. Yet there was handled on the Monongahela, in 1920, 24,264,-354 tons of traffic, valued at more than $199,000,000.

The splendid arch of Pittsburgh's industrial development rests upon water at both ends—for, without the hundreds of millions of tons of coal carried on the Monongahela and the hundreds of millions of tons of iron ore carried upon the Great Lakes, Pittsburgh would still be a stripling instead of the giant that she is today—the United States would rank second or third among the nations of the world in the production of steel, instead of being the unapproachable first, and Germany would probably have won the World War, for it is said that the Pittsburgh District furnished 60 per cent of all the steel that went from this country into munitions both for the Allies and the armies of the United States.

To render the highest service of which they are capable, the waterways, both North and South, must not only be completely improved but united into a single connected system. Furthermore, the relations between railways and waterways must be established on a basis of constructive co-operation instead of that of destructive competition. The Government barge line on the Mississippi already has through-route and joint-rate arrangements with 165 railroads, covering a territory extending from the eastern line of Ohio to Nebraska and north to the Canadian boundary.

Although the canalization of the Ohio River will not be completed for another five or six years, an inquiry made by the Ohio Valley Improvement Association shows that more than $40,000,000 has been invested in boats and barges on the Ohio and its tributaries since 1919. The managers of great corporations, such as the Pittsburgh Steel Companies and the Standard Oil Company, invest millions of dollars in boats and barges, not because of any sentimental regard for waterways but purely for business purposes. The iron and steel interests of St. Louis and Birmingham are planning a greatly increased use of the Mississippi and Warrior rivers, respectively, and it is evident that Southern waterways are destined to play a most important part in the further development of "the basic industry of modern civilization," and of many more besides.

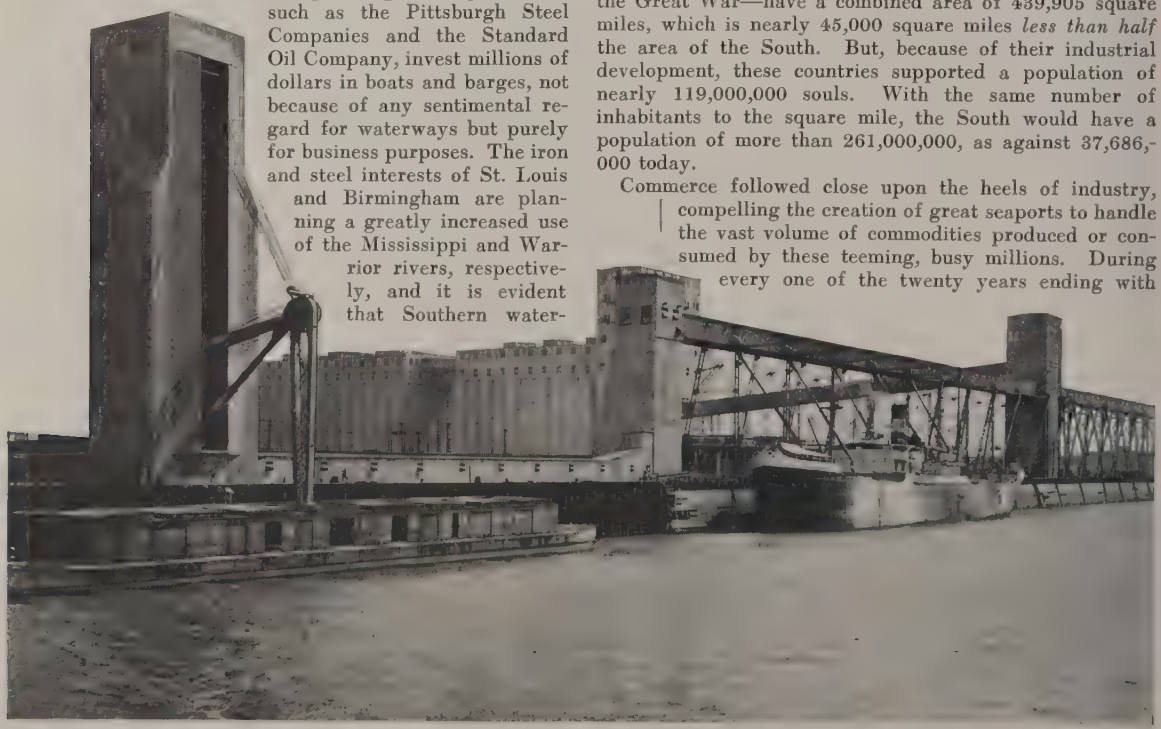
As a broad generalization it may be said that up to the Civil War the development of the South was largely, and for fifty years after the War was predominantly, agricultural. Today the products of factory surpass in value the products of agriculture, and its swift advance in recent years points to a time, and one not far away, when industry shall still further advance more rapidly than agriculture, and the rivers of the South will help mightily toward this result both by the power from their turbulent head-

Acres of Sugar at New Orleans Docks Awaiting Transshipment by Government River Barge Line and Rail

waters and by the navigation on the quiet reaches lower down.

A glance at what exists today, elsewhere, will give some little hint of what the South shall be in days to come. France, Belgium, Holland and Germany—as it was before the Great War—have a combined area of 439,905 square miles, which is nearly 45,000 square miles *less than half* the area of the South. But, because of their industrial development, these countries supported a population of nearly 119,000,000 souls. With the same number of inhabitants to the square mile, the South would have a population of more than 261,000,000, as against 37,686,-000 today.

Commerce followed close upon the heels of industry, compelling the creation of great seaports to handle the vast volume of commodities produced or consumed by these teeming, busy millions. During every one of the twenty years ending with

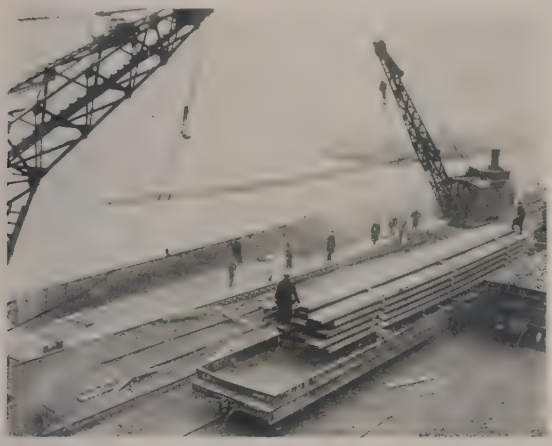


REINFORCED CONCRETE PUBLIC ELEVATOR AT NEW ORLEANS WITH CAPACITY OF 2,622,000 BUSHELS OF GRAIN—RIVER BARGE BEING UNLOADED AND OCEAN STEAMSHIP LOADED SIMULTANEOUSLY

1913 Germany alone, with an area 57,000 square miles smaller than Texas, had a foreign commerce greater by hundreds of millions of dollars than the United States, the excess for 1912 being $853,000,000.

The four countries named lie nearer to the seaboard, on the average, than the South, and have 23,200 miles of waterways, completely improved, interconnected and regularly used, as against 21,000 miles of half-finished, largely disconnected and slightly used waterways in the South. But as to all the rest: Have they a better soil or climate or greater natural resources than the South? Have their people greater ability and energy than those of the South? The answer, if any be needed, is to be found within the pages of this book.

Unwisdom would be shown, not by one who should prophesy great things for the future of the South but by one who should attempt to fix the bounds of possible achievement. But, even though achievement reach to heights undreamed of now, the harbors that dot her coasts and the rivers that thread her soil will serve the South—and the nation—through all the unknown future, even as they have served through all the storied past.



Loading Steel on River Barges at Duquesne Works of Carnegie Steel Co.

Barge Line Terminal at Cordova, Ala.

Rivers Again Linking North and South, East and West.

By W. T. Mossman, Pittsburgh, Pa.

An enterprise that used to flourish in the olden days, which sank into insignificance with the advent of the railroads, but today is reviving and expanding under new and modern conditions, is the transportation of freight on the streams of the Mississippi Valley. In the beginning of our history as a nation the Ohio and Mississippi and their tributaries were the natural highways. With the invention of the steamboat their use for transportation of passengers and freight became universal. But the Civil War broke in twain these lines of communication between North and South, and the westward-pushing railroad systems attracted and took the business, offering facilities cheaper and more convenient than the rivers.

However, another war, the World War, has again shifted the scenes. High freight rates, crippled condition of railroad operation and expansion, inability of the rail system to arise and flourish again under the impediments of too much governmental regulation and repression, and other consequences of that tremendous conflict have given the rivers their opportunity to stage a "comeback."

The result is that they are being utilized now as never before in their history. The largest manufacturers and producers have turned to them for low-cost distribution of great quantities of materials, using them, however, strictly as supplements to the railroads, not as competitors. Shipping long distances by river and transferring the commodities to railroad cars for even longer conveyance inland is the system now experimentally being developed and which bids fair to become an established and very great transportation facility, enlarging the scope of distributing services and eventually aiding to reduce the costs of living.

Steel, oil, gasoline, coal, wheat, cotton, tobacco, and even pork and beans, are some of the commodities now finding low-cost outlet through the great 6000-mile system of trunk-line waterways in the Mississippi basin.

Thousands of tons of steel go South from Pittsburgh every month. Thousands of barrels of oil and gasoline come North. Wheat from the great farms in the Northwest finds its way to export out of New Orleans in barges from St. Louis. Cotton goes South to ships from Memphis, and may eventually come North through Pittsburgh and be reshipped here to New England by rail. A recent shipment of Indianapolis canned pork and beans, consisting of nearly forty freight carloads, was made by river from Cairo, Ill., to New Orleans and thence by freighter through the Panama Canal to the Pacific Coast, twice the distance of rail shipping, yet effected at an appreciable saving in transportation costs.

Transportation of gasoline in tank barges from New

Orleans, Destrehan and Baton Rouge to Memphis and Louisville and other points, where it is transferred to shore tanks and thence distributed to filling stations by motor-tanks and railroad tank cars, is now a fairly well established industry.

Steel pipe, nails, farm fence, tinplate, structural shapes and other products of Pittsburgh mills used on the farms and oil fields of the South and Southwest are now regularly moving out of Pittsburgh on the Ohio, in tows of steel barges carrying a total of 5000 to 10,000 tons each, to Louisville, Evansville, St. Louis, Memphis and New Orleans. At these cities these products are transferred to rail and distributed far inland. There have been tows of steel whose cargoes traveled a thousand miles by river and another thousand by rail, being distributed to customers at interior points in twelve or thirteen states.

The Jones & Laughlin Steel Corporation of Pittsburgh made its twenty-third down-river shipment of hundreds of carloads of steel in November in especially designed barges with one of their own fleet of several steamboats. Jones & Laughlin adopted this delivery system about three years ago, and since then has been followed by most of the other large steel companies.

Uncle Sam himself owns and operates the largest of these services. It is the Mississippi-Warrior Service, established during the war as an auxiliary to rail transportation, and now operated by the United States Inland Waterways Corporation as a common carrier between St. Louis and New Orleans and between Birmingport and New Orleans. Last year it transported 595,116 tons of freight at an aggregate freight saving of nearly $900,000 to the shippers and receivers and through them to the public.

The time made in river shipping is said to surpass that averaged by rail. A Carnegie Steel Company tow of ten 1000-ton barges loaded with steel recently made the run of 2000 miles to New Orleans at an average rate of better than 150 miles a day. A Jones & Laughlin tow last fall made the thousand-mile run to Cairo, where the Ohio flows into the Mississippi, at an average rate of better than 200 miles a day.

A handicap to the present full use of the rivers as freight carriers is found in their incompleted condition as to channels. The Ohio, for example, will not be ready for year-round navigation before 1929, and in the interval through shipping will be obliged to suspend during at least one-fourth of each year owing to low water in the uncanalized lower reaches of the river. Similarly, connection between the Great Lakes and the Mississippi at Chicago awaits the completion of the 63-mile-long Illinois state canal between the Chicago Drainage Canal and the head of the Illinois River, a matter of a number of years yet. There are other projects awaiting completion upon important tributary streams, notably the intracoastal canal from New Orleans to the Rio Grande, and many years will elapse before they are available to modern boats and barges, but when completed the United States will have a network of inland waterways many thousands of miles in extent and without equal, in fact not possible to approach, in any other nation in the world as a low-rate transportation facility supplementary to the railroads for distribution of the nation's products.

GOVERNMENT BARGE LINE COAL TERMINAL AT MOBILE, ALA.

The Manufacturers Record

THE SOUTH'S DEVELOPMENT will reach some thousands of people in different parts of this country and abroad who are not regular readers of the MANUFACTURERS RECORD, and for their benefit, therefore, it may be said that the MANUFACTURERS RECORD is a weekly paper, widely known as the "Exponent of America," which covers all phases of Southern activity and is devoted to the upbuilding of the nation through the development of the South and Southwest as the nation's greatest material asset. In compliance with the regulations of the Postoffice Department, the regular issue of this date is known as Part I, and THE SOUTH'S DEVELOPMENT as Part II.

To the Printers We Extend Our Hearty Appreciation for Their Splendid Work

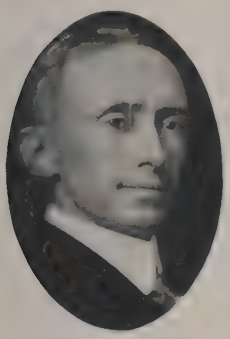
THE SOUTH'S DEVELOPMENT, for size and beauty of printing combined, has probably not been equaled in any other publication issued by any newspaper in this country. As an artistic job of printing it is worthy of the highest commendation, and we are glad to give this word of praise, unsolicited, to the Fleet-McGinley Company, an open-shop printing house in Baltimore in which the MANUFACTURERS RECORD is printed every week.

The work has been handled by the printers expeditiously and with a spirit of thorough co-operation from the officials and the superintendent down through the entire force.

Hydro-Electric Development in the South

By Thomas W. Martin, President Alabama Power Company, Birmingham, Ala.

In that immense area which we call the South, extending from the southern border of Pennsylvania, West Virginia, Ohio, Illinois, Iowa and Kansas to the Gulf of Mexico and from the Atlantic Ocean to the western border of Texas, comprising in all 945,000 square miles, or about 31 per cent of the land area of the United States, and 37,000,000 people, 96 per cent native born, there has occurred in recent years the most marked development of any section of our country. The South is an agricultural empire; it is rapidly becoming an industrial empire.



Thomas W. Martin

Blessed with a climate unsurpassed, a productive soil, a generous and well-distributed rainfall, with potential wealth in the earth, forests and rivers such as no other section can boast, the people of the Southern states have recovered from the Reconstruction period following the Civil War and are today making rapid strides in the acquisition and distribution of wealth, in civic and educational progress, and in acquiring the things wealth can buy, including the leisure which can be devoted to spiritual things and service for others.

As the achievements of science and invention have lightened man's toil, so has modern civilization progressed, and this has been no less true of the South than of other sections of the country. This is largely responsible for the progress which the South has made within the last decade.

No single material factor contributed more to recent progress than the development of the water-powers of the region and the wide distribution of electrical energy to homes and work shops which has followed such development.

The scope of this subject necessitates a brief reference to past conditions to enable one to appreciate the effects of power development in the South. Just prior to the Civil War the people of the South were turning their attention to industrial pursuits, and in nearly every line of manufacturing progress, as measured in percentages, was greater in the South than in the rest of the country. This was quickly changed as a result of the Civil War. For many years following in the wake of Reconstruction the South steadily declined in productive power, and in many sections even tax values did not reach the ante-war level for more than thirty years.

With the recognition that the South had mineral resources perhaps greater than any other similar area, and that it had men of creative spirit, willing and desirous of taking their places in science and industry, there came, but somewhat slowly, an advance in many of the industrial arts. This is strikingly evidenced by comparing the value of manufactured products in the Southern states in 1880 of approximately $622,000,000 with $9,805,000,000, the 1920 census value of such products. This may also be evidenced to an extent by the increase in assessed value of taxable property in the South from $6.500,000,000 in 1900 to nearly $30,000,000,000 in 1922.

The development of water-power in the South within the last twenty years has not only greatly contributed to its increased wealth, but has brought to many, who must otherwise have done without, the comforts and conveniences of modern civilization by extending the use of electrical energy to thousands of homes on the farm and in the city to lighten the burden of the farmer or housewife, and by increasing the volume and cheapening the cost of manufactured products.

Though many sections of this extensive region have but little water-power which can be economically developed, so great have been the strides in the art and practice of transmission that many communities receive and use electrical energy generated in water-power plants located at great distances away. The extension of power transmission lines is constantly in progress into sections remote from water-power plants now served wholly, if at all, by inefficient steam plants. As these extensions are made the people not only get better service, but, due to more efficient production and distribution, rates are usually lower than formerly obtained from small, isolated steam plants.

The outstanding fact apparent to all connected with the electrical industry is the avidity with which the American people in homes and in shops use and find new uses for electricity.

The rate of increase in the use of electricity for the South in the ten-year period ending 1923 was 212.7 per cent, while the rate of growth for the remainder of the country in the same period was 147.9 per cent.

According to the Department of Labor report of September, 1923, the cost of electricity throughout the United States was 5.1 per cent less than it was before the World War, despite the greatly increased cost of labor, coal and other materials. This was due to three elements: The development of water-powers, greatly increased efficiency of steam plants, and the interconnection of the larger central stations, thus insuring a greater efficiency of service.

It should be remembered that 90 per cent of the electricity used from public-utility circuits throughout the country is generated by privately owned electric light and power companies, while in the Southern states approximately 98 per cent of the electricity used is generated by privately owned companies, and the service rendered by them is not approached in quality, cheapness or reliability by that of any other kind of utility.

In many sections of the South where hydro-power is available the cost per horsepower year to the consumer has decreased 70 per cent, within a single decade, as compared with a decrease of only 4 per cent where there exists no hydro-power development.

This reduction in the cost of power is reflected in rapid industrial expansion on the one hand, as compared with but little industrial growth upon the other.

Perhaps no better illustration of the influence of water-power development can be had than by contrasting the increase in manufactures in the adjoining states of Alabama and Mississippi.

During the ten-year period (1909-1919)* the United States census figures showed that there was an increase of 75 per cent in the horsepower used in manufactures in Alabama and a *decrease* of 2½ per cent in Mississippi; a decrease of $51 in the cost of a horsepower per year in

* Abstract of Census of Manufactures, 1919. The cost figures are approximately the same for 1924.

Alabama and a decrease of but $3 in Mississippi; that the value of manufactured products increased $347,731,000 in Alabama and but $27,592,000 in Mississippi, and that the number of wage-earners increased 49 per cent in Alabama and but 16 per cent in Mississippi.

That the greater progress in Alabama is not due entirely to its mineral wealth, but is greatly influenced by the development and transmission of power over a wide area, is further shown by the fact that Alabama manufactures 53 per cent of its cotton into finished goods and Mississippi manufactures only 5 per cent, and that of this 53 per cent manufactured in Alabama, over 95 per cent is manufactured by the use of hydro-electric power.

Cotton spinning is a typical industry which has followed hydro-power development in the cotton-growing states of the South. In North and South Carolina there has been created a great power system, with transmission lines extending into many towns and cities, resulting in the construction of 497 textile plants, which in 1923 consumed more cotton than was produced in these states.

Further, in five of the Southern states where power development has gone forward most rapidly, there was produced in 1923 3,650,000,000 kilowatt hours of electrical energy, of which 2,800,000,000, or 75 per cent, was furnished by water-driven generators. In the same states there are now approximately 15,000,000 active spindles, while in five other Southern states, where but little or no power development exists, there are 1,200,000 spindles.

Thus the influence of water-power development on the industrial growth of the South is strikingly shown in the textile industry, which has resulted in more than one-half of all the cotton spindles in the United States being established in the cotton states of the South, which now consume 64 per cent of the cotton used in American mills.

Southern Water-Power Resources and Development

The following table, taken from Document L-7115, Geological Survey, Department of the Interior, dated April 29, 1924, shows the potential horsepower without storage, and the capacity developed of all water-power sites above 100 horsepower in the South:

Hydro-Electric Power in the South

State	*Available 90 per cent of time Horsepower	Available 50 per cent of time Horsepower	Capacity developed Horsepower
Alabama	472,000	1,050,000	215,863
Arkansas	125,000	178,000	1,189
Florida	10,000	18,000	7,036
Georgia	572,000	958,000	364,394
Kentucky	77,000	184,000	1,256
Louisiana	1,000	2,000	....
Maryland and District of Columbia	106,000	238,000	7,896
Mississippi	30,000	60,000	....
Missouri	67,000	152,000	17,970
North Carolina	540,000	816,000	431,500
Oklahoma	70,000	194,000	1,718
South Carolina	429,000	632,000	357,510
Tennessee	432,000	710,000	128,465
Texas	238,000	514,000	13,820
Virginia	459,000	812,000	109,798
West Virginia	355,000	980,000	14,711
Total South	3,983,000	7,498,000	1,673,126

In the later discussion of available and developed powers in the states mentioned some variance will be found in figures reported from local sources which are not, however, of vital importance in this discussion.

* Usually classed as commercial power; however, power available 50 per cent of the time may be commercially usable in a system having several hydro plants on same or different watersheds to permit of diversity of use or having water storage or steam plants to supply deficiency.

In all water-power developments the primary power will represent the rating of the development; but the secondary power, which is available for only part time, can become of much more importance and value if the power developments are interconnected. Therefore, as pointed out in this discussion, the foregoing estimate can be largely increased by storage and interconnecting plants in different watersheds in order to obtain the benefit of diversity of stream flow and complete utilization of storage.

Moreover, to say that a state possesses a given horsepower in potential power does not necessarily mean that the power is now commercially available; often a considerable portion cannot be economically developed under existing conditions. On the other hand, a large amount of potential water-power is contained in small streams, the development of which in the near future will undoubtedly be economic and commercial in connection with an interconnected power system of both hydro and steam plants to supply the deficiencies which are inevitable in small developments.

The most important sections of the South having water-power possibilities are:

(a) The Southern Appalachian section, embracing parts of the states of Maryland, Virginia, Kentucky, North Carolina, South Carolina, Tennessee, Georgia and Alabama. The characteristics of this section, including geology, climate, rainfall, vegetation, etc., are so similar that the section can best be treated without regard to state lines.

(b) The Pecos, Devils and Colorado River sections in Texas.

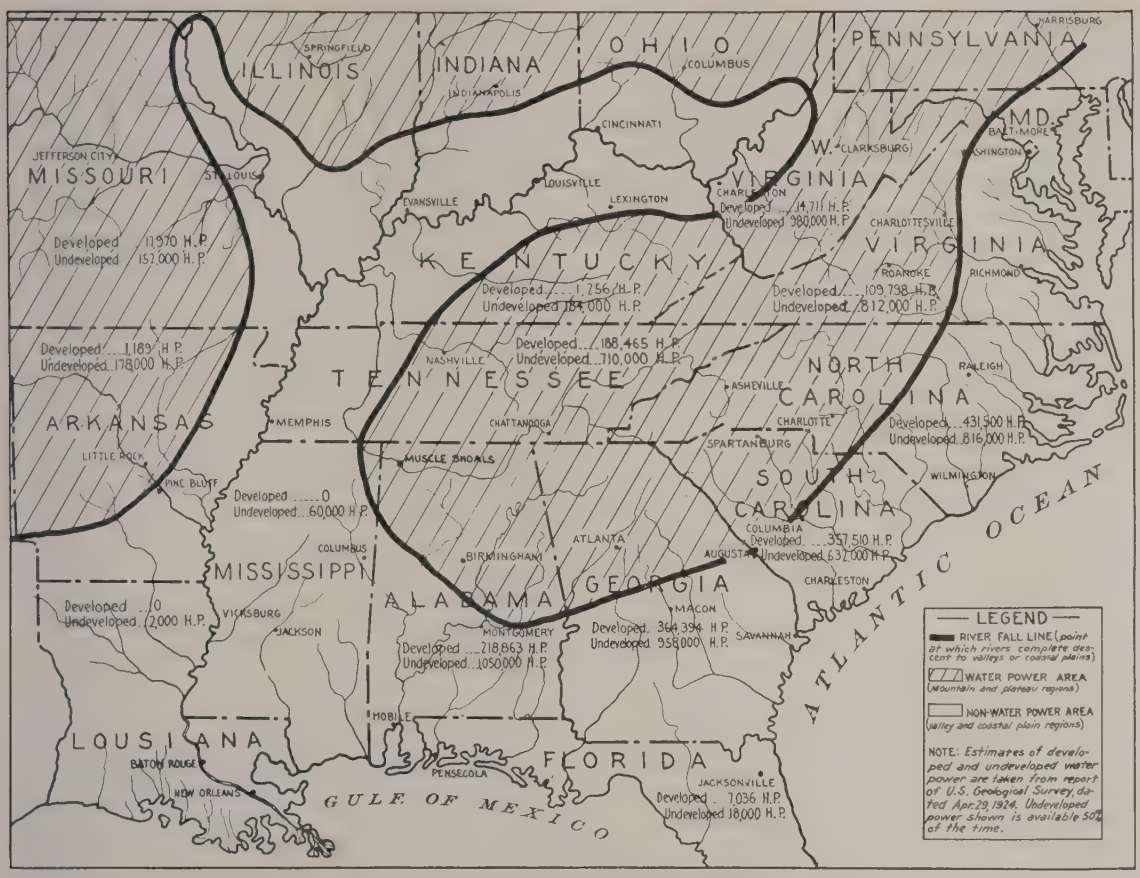
(c) The White and Ouachita River sections in Arkansas.

Water-Power Developments and Use in the Southern Appalachian States

It is in this part of the South that the most forward steps have been made in the development and use of hydro-electric energy—developments which have very vitally affected the life of the people and, in fact, the whole social structure of the section.

The rivers of this region flow into the Atlantic Ocean or the Gulf of Mexico, and those of most importance in water-power development are the Yadkin; the Tennessee and its tributaries; the Coosa, Tallapoosa, James, Susquehanna, Catawba, Tallulah, Tugalo, Savannah, Chattahoochee and Ocmulgee. The fall line of the Appalachian chain of mountains meets the coastal plain in middle and north Alabama, and immediately to the south and west there are no important power possibilities. The flow of Southern rivers is irregular and varies greatly from season to season. If one plant on these streams were the sole source of energy for a distribution system, obviously only a minimum amount of power could be relied upon for year-around operation. Continuous power is known as primary power, represented by the amount of energy which the low flow of a stream will generate. The difference between that amount and the quantity of energy that may be developed from the high flow of a stream is secondary power, available for use during certain periods of the year. Hence, economy of development, with a view to securing the lowest average unit cost over the period of a year's operation, requires that means be employed to supply the deficiency during the dry or low flow seasons

Sound business requires the installation of equipment at plants sufficient to generate power in excess of the amount that may be produced from low flow of the stream, provided a certain amount of the deficiency can be made



up otherwise without excessive cost per unit of power compared with the unit cost for the entire output of one year. Experience and knowledge of local conditions, market demands, average rainfall, etc., have demonstrated the extent to which such investments are justified. The low-season deficiency is usually made up by operating steam generating plants. In recent years some of the companies have constructed reservoirs or large storage pools for impounding water during high-flood seasons for release and generation of power when the stream flow is low. Where plants are connected by locating on streams in different drainage areas it is possible to maintain a uniform supply, due to the difference in stream flow. A combination of the three methods, where conditions permit, affords the most economical operation and insures the greatest average output at the least possible cost.

Hydro-electric plants located on and near the Piedmont Plateau send their wires up into the hill country and down into the plain, to city and to village. The transmission lines cover the greater part of Alabama, Tennessee, the Carolinas, Georgia and parts of Virginia and West Virginia. The towers which carry them "march in Indian file, bearing the thunderbolt on their shoulders." But the thunderbolt is under control; it goes into the home, into the factory, into great and small industries, to lighten labor and sweeten rest. The energy transmitted over these wires transformed the face of this section and changed the lives of its people.

Cotton mills and other manufacturing plants sprung up, steel plants were constructed, mines opened, and new towns and villages built away from congested centers because of available power at low rates. The people who work in these industries and their families, as well as the merchants and the professional men, have prospered and increased their well being. Improved health and living conditions in the South has been a tremendous factor—made possible by establishing new communities in sections which by nature are easily adapted to modern living conditions. Because of cheap and abundant power, production in the aggregate and per capita increased greatly in the sections served by these transmission lines. The more power per worker the higher the wages he receives, which in turn affects the wages and salaries of everyone in the community.

Hydro-electric development in the South on a large scale was begun by James B. Duke and W. S. Lee of the Southern Power Company about twenty years ago. Mr. Duke also became interested in a large way in the cotton-mill industry in the Carolinas, using cotton grown in the vicinity of the mills and using power from adjacent hydro-electric plants. As a result, the development of the textile industry in that state is not exceeded by any state in the Union. The hydro-electric projects started by Mr. Duke resulted in the organization of the Southern Power Company. It was followed by the Yadkin River Power Company, on the Yadkin River in North Carolina; the Georgia Railway & Power Co., on the Tallulah; the Tennessee Electric Power Company, on the Ocoee; the Columbus Electric & Power Co., on the Chattahoochee, and the Central Georgia Power Company, on the Ocmulgee.

The development of hydro power in Alabama was planned in a large way by Capt. W. P. Lay of Alabama

in 1907, but did not begin until 1912, when, due to the vision and energy of the late James Mitchell, president of the Alabama Power Company, the Lock 12 plant on the Coosa River was built.

The growth of the Southern power companies is remarkable. The following table shows the plant capacity as of January 1, 1924, of some of the largest companies and the total generation of their systems, including plants under construction:

CAPACITY OF SOUTHEASTERN POWER SYSTEMS
(IN KILOVOLT AMPERES)

	Hydro plants	Steam plants	Total
Southern Power Company	413,150	130,250	543,400
Carolina Power & Light Co.	26,900	36,250	63,150
Georgia Railway & Power Co.	197,400	20,000	217,400
Central Georgia Power Company	12,000	18,000	30,000
Columbus Electric & Power Co.	150,000	9,000	159,000
Tennessee Electric Power Company	107,555	88,850	196,405
Alabama Power Company	399,500	172,300	571,800
Total	1,306,505	474,650	1,781,155

MARYLAND AND DISTRICT OF COLUMBIA

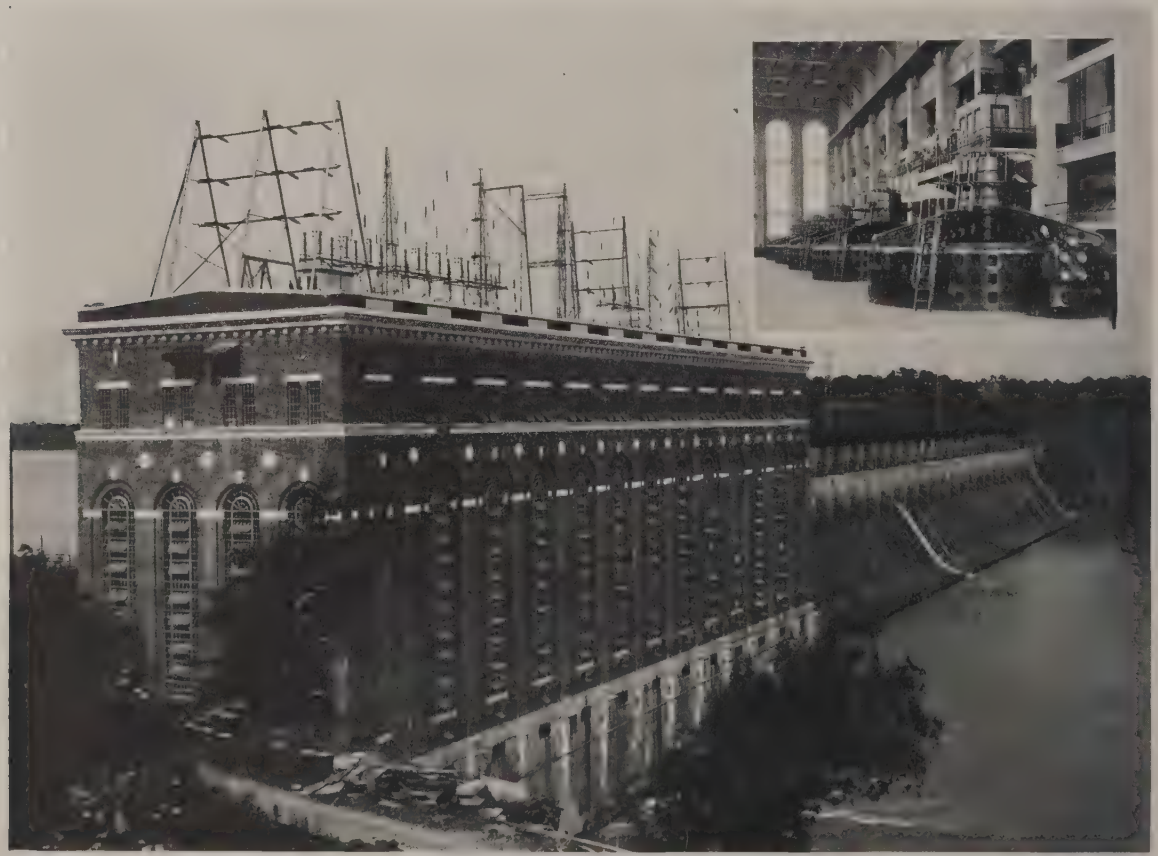
Reports of the Geological Survey show 238,000 horsepower in Maryland and the District of Columbia available 50 per cent of the time, of which 7230 horsepower is developed and used principally for manufacturing and miscellaneous purposes.

The city of Baltimore has, however, received a principal part of its electric power for many years from the large hydro-plant of the Pennsylvania Water & Power Co., located at McCall's Ferry, on the Susquehanna River near Holtwood, Pa. This development has a capacity of 150,000 horsepower.

Those in position to know state that the remarkable industrial growth of the Baltimore district in large part is due to the transmission of hydro-power into the district from the McCall's Ferry plant, which, however, has lately been supplemented by the steam plants of the Consolidated Gas Electric Light & Power Co., having a generating capacity of 273,000 horsepower.

Several large hydro developments are now in progress in Maryland. The Youghiogheny Hydro-Electric Power Corporation is constructing a project on the Youghiogheny River, consisting of four developments of a total installed capacity of 150,000 horsepower, and with an annual production of 317,000,000 kilowatt hours. The initial development is being made at Deep Creek with an installed capacity of 24,000 horsepower, and will be placed in operation in 1925.

A preliminary permit has been issued to the Susquehanna Power Company for the Conowingo project on Susquehanna River, in Cecil and Harford counties, Mary-



LOCK 12 POWER-HOUSE AND DAM ON THE COOSA RIVER OF THE ALABAMA POWER COMPANY, 50 MILES FROM BIRMINGHAM

Plant Capacity, 110,000 Horsepower. Insert—Generating-Room Containing Six Units; Four of 17,500 Horsepower and Two of 19,500 Horsepower Vertical Single-Runner Turbines. Directly Connected to 13,500 Kva, 6000-Volt Generators

land, and in Lancaster and York counties, Pennsylvania. This development is of special interest, since it will probably be the largest single power development on the Atlantic seaboard. It is proposed to construct a dam near Conowingo, Md., creating a pool 10½ miles in length extending to the tailrace of the dam at McCall's Ferry. An installation of 360,000 horsepower, or more than the total present development on the American side of Niagara Falls, is contemplated, at an ultimate cost likely to exceed $30,000,000. When this project is completed the Susquehanna Power Company will be in position to supply electrical energy to communities within a radius of 150 miles from Conowingo.

The tentative plan for the Great Falls power project on the Potomac River in the District of Columbia, which is at present under discussion, was developed by Major Tyler of the United States Engineer Corps. This plan involves the construction of two power dams, with proposed installation of 225,000 horsepower, and three impounding reservoirs: one on the south branch of the Potomac, the second on the Cacapon River, and the third on the north branch of the Shenandoah. It is estimated that these developments will have an output of 675,000,000 kilowat hours, which is largely in excess of the power demands in the District of Columbia at present. A bill providing for the development of this power by the Government passed the United States Senate and is now pending before the House committee.

Virginia

The Geological Survey reports indicate a potential water-power of 812,000 horsepower available 50 per cent of the time. There are at present seventy hydro plants in Virginia with a total installation of 109,798 horsepower, of which 82,656 horsepower is for public utility and municipal use.

The largest plants are those of Virginia Railway & Power Co., on the James River near Richmond, of 17,000 horsepower, and Appalachian Power Company, on the Roanoke River, near Roanoke, of 11,000 horsepower.

A license has been granted by the Federal Power Commission to the Virginia Western Power Company for a 2400-horsepower plant on the James River at Balcony Falls, about twenty miles from Lynchburg.

The Northeast Super Power Committee (Report of May, 1924) suggested the construction of four plants on the New River, in the southwestern part of the state, totaling 100,000 horsepower. On the James River, between Lynchburg and Richmond, a 25,000-horsepower plant is also proposed. The Potomac River, along the boundary between Virginia and Maryland, is capable of development of approximately 225,000 horsepower.

One of the very important developments in Virginia is the electrification of the Virginian Railway between Roanoke, Va., and Mullins, W. Va., a distance of 137 miles, the work being now in progress, the power to be supplied by a generating station being constructed by the railroad company.

West Virginia

The hydro-electric resources of West Virginia, amounting to 980,000 horsepower, are largely undeveloped, there being a total of 8446 horsepower now in public-utility service, besides 6265 horsepower in many small industrial plants throughout the state.

The two streams in West Virginia capable of considerable hydro development are the Cheat and New rivers.

Preliminary permits have been granted by the Federal Power Commission to West Virginia Power & Transmission Co. for a series of developments on Cheat River to have a proposed installation of 600,000 horsepower; to the West Virginia Power Company for a development on New River of 125,000 horsepower; to C. B. Hawley for a development on New River of 20,000 horsepower; to Gauley Power Company for a development on the Gauley and Meadow rivers of 95,000 horsepower, making total installation of 840,000 horsepower in proposed developments. The proposed development on New River of the West Virginia Power Company will include a storage plant, which will be one of the largest of this type in the Southeastern section.

It is understood that active work is in progress on plans and data for several of these developments.

North and South Carolina

The major portion of the large hydro-electric plants of North and South Carolina are owned by the Southern Power Company, with total capacity of 507,000 horsepower, and the Carolina Power & Light Co., with total capacity of 26,900 horsepower, in addition to fifty plants of other utility companies, with a total capacity of 129,350 horsepower.

The largest development in North Carolina made by a non-public utility is that of the Tallassee Power Company, a subsidiary of the Aluminum Company of America, on the Yadkin River, with an installation of 185,000 horsepower, making a total of 754,400 horsepower developed in the two states.

As noted, hydro-power development has gone forward in North and South Carolina more rapidly and with greater results upon the social and economic life of the communities than any other section of the South.

No discussion of the water-power developments of the South would be complete without special reference to the projects of the Southern Power Company on the Catawba River and on the Broad River, which are among the largest in the Southeastern section. These plants, operating in conjunction with the Bridgewater Reservoir on the headwaters of the Catawba River, constitute at present the principal source of hydro-electric power of both North and South Carolina. The Catawba, with two new developments of the Southern Power Company now under construction, will be one of the finest examples in America of the intensive and intelligent development of a great natural resource—a mighty river completely harnessed to perform the service of mankind. The ten water-power stations will have a total capacity of 483,000 horsepower and a storage capacity of 175,000,000,000 gallons of water, supplying in the main the energy for turning the wheels of 300 cotton mills and keeping 5,000,000 spindles busy turning cotton into cloth.

Due to the rapid industrial development of the section, and the limited power resources which could be developed, all of the companies engaged in hydro development have found it necessary to construct large steam plants to supplement the varying flow of the streams. Much study has been given very recently to the hydro-power situation in this section with the view of further conserving the resources by more complete development.

Applications are pending before the Federal Power Commission for developments to have the following proposed installation: Southern Appalachian Power Company, on the Hiawassee River, 38,300 horsepower; Hiawassee River Power Company, on the Hiawassee River, 107,800 horsepower; Thompson Power Company, on the Hiawassee River, 44,000 horsepower, part of total development of 259,000 horsepower noted under Tennessee; and in South Carolina as follows: Lexington Water

MOUNTAIN ISLAND STATION ON CATAWBA RIVER OF SOUTHERN POWER COMPANY

Power Company for a development on the Saluda River of 48,000 horsepower; Central Carolina Power Company for a development on the Broad River, 38,400 horsepower; South Carolina Power Company for a development on the Saluda River, 48,000 horsepower, and license has been granted to Columbia Railway & Navigation Co. for development on the Santee and Cooper rivers of 150,000 horsepower.

North Carolina has taken an especial interest in the conservation of the forests and the streams by co-operating with the counties and the United States Forest Service in the protection of its forests from fire and encouraging reforestation, not only in the interest of a future timber supply but also because of its influence upon the flow of the streams whose headwaters are within the forested area and which have a direct influence and bearing upon the water-power and on navigation. Such forest protection work in western North Carolina has an effect on the Tennessee River and the water-power of this section, since one-third of the drainage area of the Tennesse River supplying Muscle Shoals rises in North Carolina.

It has been stated by Col. Joseph Hyde Pratt, the well-known economist and engineer, that by 1930 the amount of electricity demanded by North and South Carolina will exceed 2,000,000,000 kilowatt hours, and will be far beyond the power of all commercially available water-powers in the section to supply. "The question vital to the future prosperity of the state," Colonel Pratt says, "is where and how this amount of power beyond home production is to be obtained and on what terms. It is probably a matter of less than six years before water-power development in North Carolina will have practically reached the limit. Industry depending on hydro-electric power will then be forced to look to other states in which power companies connected with the interconnected power system are located."

Georgia

Georgia, with potential power resources of 958,000 horsepower available 50 per cent of the time, has a number of important hydro developments. They have been made principally by the Georgia Railway & Power Co., Central Georgia Power Company and Columbus Power Company, their installed capacity, including plants under construction as of January 1, 1924, being:

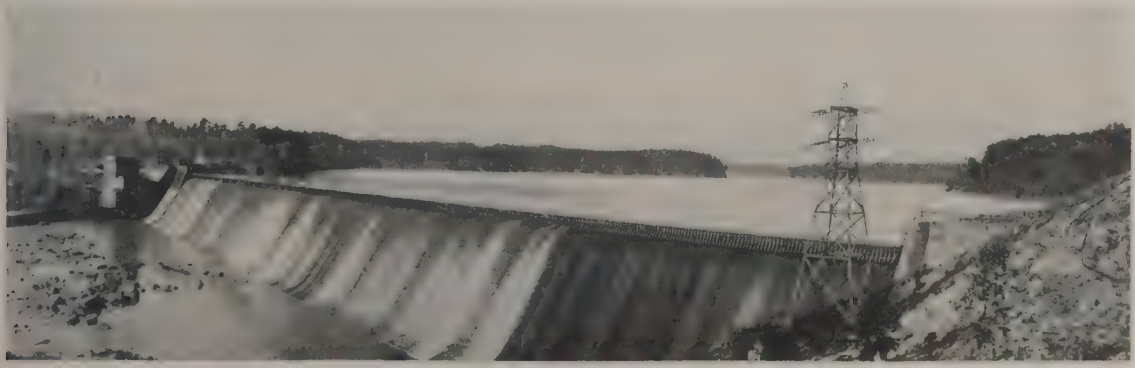
	Horsepower
Georgia Railway & Power Co.	244,000
Central Georgia Power Company	24,000
Columbus Electric & Power Co.	150,000
Total	418,000

These developments are located on the Tallulah, Tugalo, Chattahoochee and Ocmulgee rivers. There are, in addition, eight or more hydro plants in different parts of the state, with a total capacity of approximately 50,000 horsepower, making a total of 413,000 horsepower which will be in public-utility service within the next few years on the interconnected systems of the state.

The first water-power plant in this section was completed at Morgan Falls, on the Chattahoochee River, near Atlanta, with installation of 17,500 horsepower, followed by the construction of several other plants on the streams mentioned. In 1912 the Georgia Railway & Power Co.

NINETY-NINE ISLANDS STATION ON BROAD RIVER OF SOUTHERN POWER COMPANY

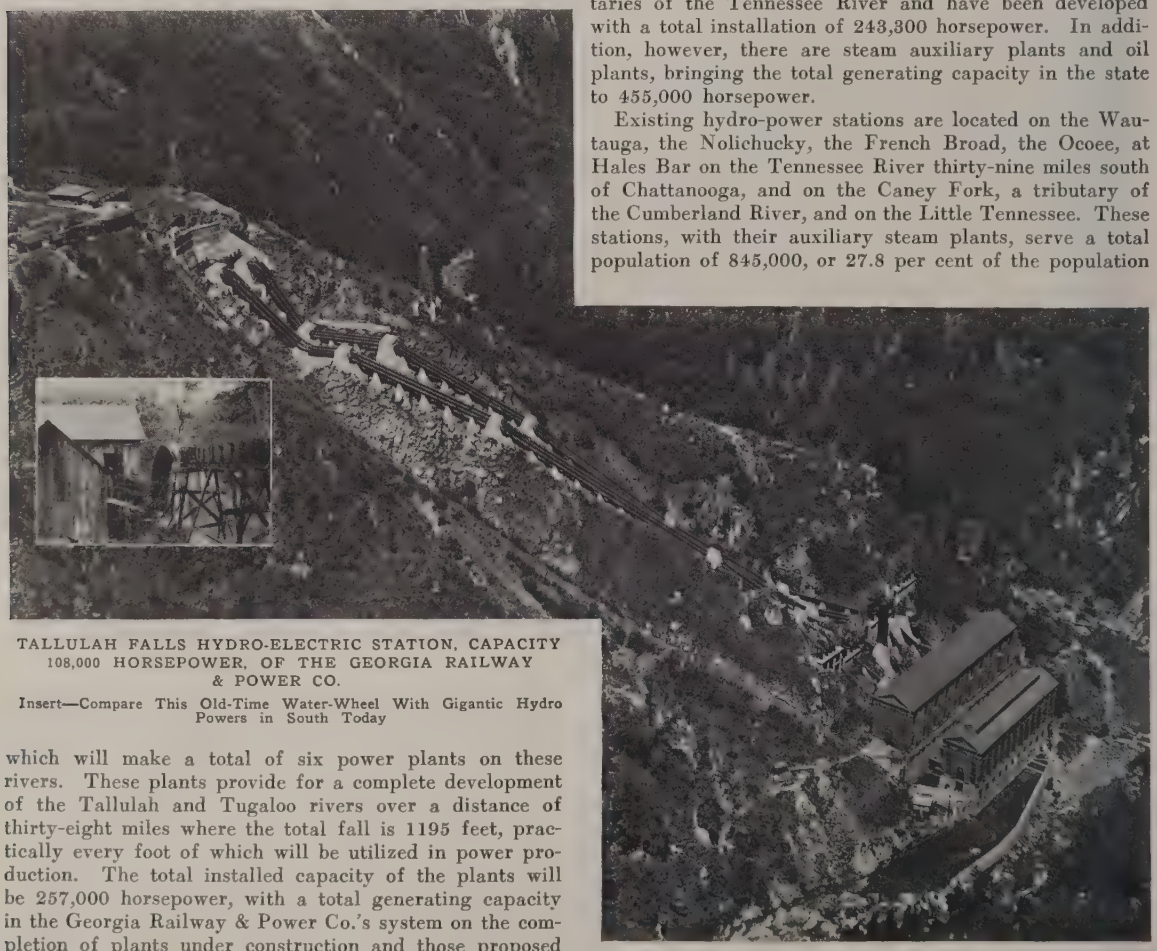
began to develop the power in the Tallulah River, first completing a plant to operate under a head of 608 feet with an installation of 108,000 horsepower, being one of a series of developments. As the Georgia load at the time could not absorb the entire output, a connecting line was constructed from Tallulah to Easley, S. C., for delivering part of the output from the new plant to the Southern Power Company system, and this line was the first step in the interconnection of the Southeastern system as it now stands. Following this, high-voltage lines were constructed in the northwestern part of the state, connecting with the Tennessee system; the Central Georgia Power Company, operating at Macon, extended a line from its new water-power plant at Jackson Shoals to Atlanta, connecting with the Georgia system, and shortly after connection was made between the Columbus Power and Georgia Railway systems, resulting in a daily interchange between these systems since this connection was made in 1914. This has resulted in an immense saving of power to the state, the Georgia Company taking all the excess hydro-power during nights, Sundays and holidays that the Columbus Power Company has had available, and returning to the Columbus Power Company during its heavy load hours in the day. In 1921 a line was constructed between the systems of Georgia Railway & Power Co. and Alabama Power Company, thus complet-



DAM AND POWER HOUSE OF THE COLUMBUS POWER COMPANY

ing the connection between seven large power-generating and transmission companies operating in five states, by means of which power generated on any of these systems can be delivered on any of the other systems.

In addition, the Mathis and Burton reservoirs, impounding 6,500,000,000 cubic feet of water, have been constructed on the Tallulah River, and construction is under way, or will shortly begin, on three other developments,



TALLULAH FALLS HYDRO-ELECTRIC STATION, CAPACITY 108,000 HORSEPOWER, OF THE GEORGIA RAILWAY & POWER CO.

Insert—Compare This Old-Time Water-Wheel With Gigantic Hydro Powers in South Today

which will make a total of six power plants on these rivers. These plants provide for a complete development of the Tallulah and Tugaloo rivers over a distance of thirty-eight miles where the total fall is 1195 feet, practically every foot of which will be utilized in power production. The total installed capacity of the plants will be 257,000 horsepower, with a total generating capacity in the Georgia Railway & Power Co.'s system on the completion of plants under construction and those proposed of 320,000 horsepower, which will be in service within the next two or three years.

To these figures should be added 174,000 horsepower as the combined generating capacity of General Georgia & Columbus Electric Power Co. serving the central part of Georgia and directly connected with the Georgia Railway & Power Co.'s system, giving a figure of 594,000 horsepower as the total generating capacity which will be in service within the next few years on the interconnected systems of the state, not including the smaller power plants not now connected with high-voltage transmission lines.

The Columbus Electric & Power Co. constructed some years ago two developments on the Chattahoochee River at North Highlands and Goat Rock with a total capacity of 30,000 horsepower (22,999 KVA), and propose to increase this capacity to a total of 90,000 horsepower (67,100 KVA), and has recently been granted a license by the Federal Power Commission for a third development on the Chattahoochee River at Bartlett's Ferry of 80,000 horsepower capacity, making a total of 170,000 horsepower capacity in the three plants.

Surveys and plans have also been made for several developments on the tributaries of the Coosa River in Georgia and also upon several other streams in that state.

Tennessee

The power streams of Tennessee are nearly all tributaries of the Tennessee River and have been developed with a total installation of 243,300 horsepower. In addition, however, there are steam auxiliary plants and oil plants, bringing the total generating capacity in the state to 455,000 horsepower.

Existing hydro-power stations are located on the Wautauga, the Nolichucky, the French Broad, the Ocoee, at Hales Bar on the Tennessee River thirty-nine miles south of Chattanooga, and on the Caney Fork, a tributary of the Cumberland River, and on the Little Tennessee. These stations, with their auxiliary steam plants, serve a total population of 845,000, or 27.8 per cent of the population of Tennessee, over 1393 miles of high-voltage transmission lines. These lines cover the greater part of the state, and other lines are contemplated in the near future which will perfect a superpower system covering the entire state.

The Tennessee Electric Power Company has four hydro plants with total installed capacity of 150,000 horsepower, having just completed an additional unit of 22,000 horsepower at Great Falls. The first 30,000 horsepower unit of the Hales Bar steam plant has just been put in service and a second unit is reported to be complete, giving this plant 60,000 horsepower capacity. At this location are to be found large coal deposits which will be the supply for this reserve steam plant which will supply the deficiency in stream flow. This plant is necessary on account of the great variation in flow which is typical of all rivers in the Southern Appalachian region. Other steam plants at Nashville, Knoxville and Parksville make the total steam reserve plant capacity 125,000 horsepower.

The Aluminum Company of America, which is not a public utility, has hydro plants in operation on the Little Tennessee River with a generating capacity of 80,000 horsepower, being part of a series of developments to be made by that company on that river.

On the Wautauga, Nolichucky and French Broad rivers are power plants of several public-utility companies having a total present capacity of 14,300 horsepower, supplying power to various towns and cities.

In addition, applications are pending before the Federal Power Commission for preliminary permits for the development of several projects on the upper Tennessee and its tributaries, with the following proposed hydro-power installations:

Thompson Power Company, on the Hiawassee River in Polk county, Tennessee, and Cherokee county, North Carolina, 259,000 horsepower; Holston River Power Company, on Holston River, 74,000 horsepower; and the Tennessee Electric Power Company; Knoxville Power & Light Company and Tennessee Hydro-Electric Company are planning a series of developments on Clinch, Powell and Tennessee rivers of 390,000 horsepower, which it is claimed will produce more primary power than can be produced at Muscle Shoals; Pigeon River Power Company, on the Big Pigeon River, 60,000 horsepower; LeRoy Park, on Nolichucky River, 50,000 horsepower, making total capacity proposed to be installed of 833,000 horsepower.

Still other projects are under contemplation, and it is quite probable that the Tennessee River and its tributaries above Chattanooga will ultimately have installations in hydro plants greater than that of any other Southern river.

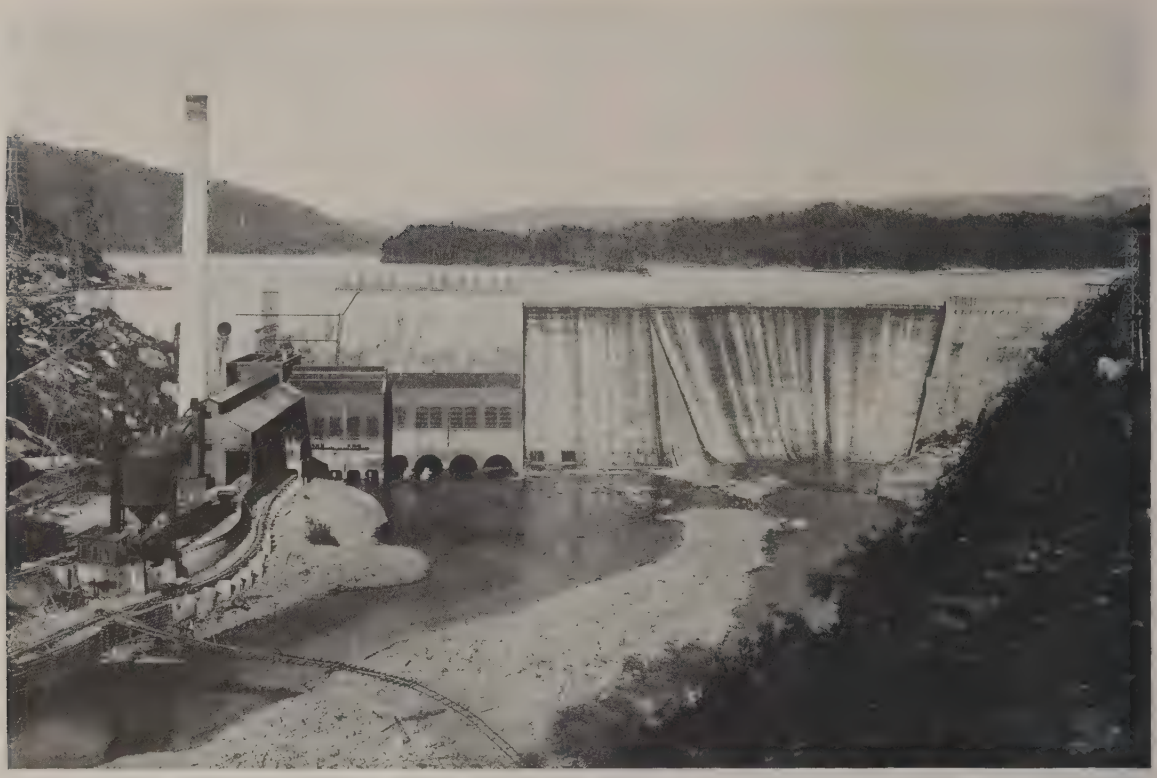
Reference should also be made to the surveys now in progress by the United States Engineers to determine the power and navigation possibilities of the upper Tennessee River and its tributaries. From general information so far available it appears that it will be possible to construct on that watershed several large storage dams in connection with the proposed power developments.

Kentucky

Kentucky has 184,000 horsepower available 50 per cent of the time. However, at present there is no public-utility hydro-power in service except two small developments of 352 horsepower. Interest is now very marked and within the next few years a number of large hydro plants will probably be completed. The Kentucky Hydro-Electric Company is constructing a plant on the Dix River which will have an installation of 30,000 horsepower. The dam will be 270 feet high and the normal output is estimated to be 77,000,000 kilowatt hours, which will be used in the large and rapidly growing system of Kentucky Utilities Company and by the Louisville Gas & Electric Co.

In addition, preliminary permits have been granted by

HALES BAR POWER HOUSE AND DAM ON THE TENNESSEE RIVER OF THE TENNESSEE ELECTRIC POWER COMPANY COMPRISES 14 VERTICAL UNITS TOTALING 50,000 HORSEPOWER



THE TENNESSEE ELECTRIC POWER COMPANY'S PARKSVILLE PLANT ON OCOEE RIVER
Hydro Plant, Capacity 30,000 Horsepower; Steam Plant, Capacity 20,000 Horsepower

the Federal Power Commission to the Louisville Hydro-Electric Company for a development on the Ohio River near Louisville to have an installed capacity of 100,000 horsepower; to the Cumberland Hydro-Electric Power Company for two developments on the main Cumberland River and one on South Fork of the Cumberland, which will probably have a combined installed capacity of 200,000 horsepower, and to the Kentucky Northern Power Company for a development on the Licking River near Falmouth, Ky., to have an installed capacity of 30,000 horsepower. The Louisville Hydro-Electric Company has applied to the Federal Power Commission for a preliminary permit to develop about 30,000 horsepower on the Green River near Mammoth Cave, Kentucky.

These developments will have certain problems both in times of high water and low water, and will, therefore, be connected with large steam generating plants located in the Kentucky coal fields, and will ultimately be interconnected with hydro-power plants in other watersheds.

The Kentucky Hydro-Electric Company, builder of the Dix River Dam, has applied to the Federal Power Commission for a preliminary permit to develop hydro-electric power on Locks 1 to 7 in the Kentucky River. It is estimated that a total of about 20,000 horsepower will be installed at all seven locks. These locks are below the mouth of Dix River, which empties into the Kentucky River at High Bridge. The proposed power plants at the locks will get the benefit of the large storage on the Dix.

TALLASSEE FALLS DAM AND POWER HOUSES ON THE EAST AND WEST BANKS. PART OF THE BUILDINGS OF THE MOUNT

MITCHELL DAM DEVELOPMENT OF THE ALABAMA POWER COMPANY

Located on the Coosa River, 14 Miles Below Lock 12. Present Capacity 72,000 Horsepower and Ultimate Installation 120,000 Horsepower

Alabama

Under authority of Congress, the Alabama Power Company erected the Lock 12 dam and power-house on the Coosa River in 1912, being the first development in that state to combine river improvement with power development. The plant has a capacity of 110,000 horsepower, and was until recently the principal source of hydropower for a large section of the state.

Under license granted by the Federal Power Commission that company completed in 1923 a second dam and power-house on the Coosa River, known as Mitchell Dam, with an installed capacity of 72,000 horsepower, and an ultimate installation of 120,000 horsepower. In the Mitchell development each unit of the plant is located in a separate concrete tower placed upstream from the dam, and during flood periods surplus water passes over the dam and removes the high tailwater from the draft-tube discharge openings, thus increasing the effective head of the plant, adding substantially to the power output over that available by the conventional type of development.

VERNON-WOODBERRY MILLS WHICH RECEIVE POWER FROM THE ALABAMA POWER COMPANY MAY BE SEEN TO THE LEFT

In addition, that company completed a dam on the Tallapoosa River in 1924 of 8000 horsepower, and also erected facilities at a second site on the same stream to utilize the unused power facilities at Tallassee Falls, making the total of installed capacity in hydro-electric plants now in service approximately 200,000 horsepower.

The Alabama Power Company was recently granted by the Federal Power Commission a license to erect a series of six additional developments on the Tallapoosa River to have a total installed capacity of 300,000 horsepower, which, with two developments downstream, making in all eight developments on the same stream, will, it is estimated, have a total installation of 427,000 horsepower; but it is important to note that this installation is only possible if these developments are connected with and operated as a part of a larger interconnected system, as the primary available power is less than 100,000 horsepower operated separately. The three principal developments of the series will be storage plants with a total ultimate available storage of 81,000,000,000 cubic feet of water, and will completely utilize the power facilities of the Tallapoosa River.

That company is now engaged in the construction of the largest development of the Tallapoosa project, known as Cherokee Bluffs, which will have a storage reservoir of 60,000,000,000 cubic feet of water, and will form a lake two miles wide and thirty miles long. In addition to providing storage for power, this reservoir will, by the storage of flood water, materially lessen the disastrous effects of the overflows which occur so frequently downstream. Again, the release of the stored waters for the generation of electric energy will normally occur in times of low water, and will thereby aid navigation on the Alabama River, into which the Tallapoosa empties, by equalizing the flow of the Alabama River at Montgomery and points downstream.

To give an idea of the character and extent of service furnished by the hydro-power company, the following is taken from the published reports of the Alabama Power Company, one of the larger companies of the South, which is typical of others: It furnishes power and lighting service to cities and towns in an area of 26,000 square miles, with a population estimated at over 1,000,000. It has a system covering over two-thirds of the state, with transmission lines aggregating 2000 circuit miles in length; owns and operates hydro and steam plants having a total capacity of 325,000 horsepower, and leases from the United States the large steam plant at Sheffield of 80,000 horsepower capacity, making a total system capacity of 405,000 horsepower. The Sheffield plant is operated for account of the Alabama Power and other interconnected companies in the Southeast. Electric service is being supplied to more than 75,000 meters. For the twelve months ending September 30, 1924, it generated 822,000,000 kilowatt hours, of which 600,000,000 kilowatt hours were generated by water power and the remainder by steam. This company serves some 300 industries, employing more than 100,000 men and women, comprising a wide variety, including coal mines, cotton mills, cotton gins, oil mills, graphite plants, machine shops, planing mills, brick plants, cement plants, public utilities and electric-furnace installations making steel, castings, ferro-alloys, phosphoric acid, concentrated fertilizers and other electric-furnace products.

There are other power developments in Alabama, with a total installation of approximately 40,000 horsepower on the Choctawhatchie, Conecuh and Pea rivers and tributaries, serving the public-utility needs of a number of communities in southern Alabama, and there are other small developments supplying local industries, but none of them of any great importance in public-utility service.

Arkansas

At present only small water-power plants are operating in Arkansas, the last report of the Geological Survey showing only 1189 horsepower developed. There is one development under way and nearing completion by the Arkansas Light & Power Co., under license of the Federal Power Commission. Two 3500-kilowatt generators are now being installed. The ultimate planned capacity of that plant is 60,000 horsepower. Construction was started some time ago on a water-power development on the Little Red River near Judsonia by the Arkansas Power Corporation. Little progress has been made, however, and no actual work done during the past twelve months.

In addition to these, there are large potential water-powers in northern Arkansas on the White River. A preliminary permit has been granted by the Federal Power Commission to the Dixie Power Company for a series of developments on the White and Buffalo rivers and on Rush Creek, which will have a total installed capacity of 150,000 horsepower.

Missouri

The recent reports of the Geological Survey show 135,000 water horsepower in Missouri available 50 per cent of the time. Other reports show a possible total of 200,000 horsepower. Of these totals, 22,000 horsepower is developed, the principal development being that of Ozark Power & Water Co., on the White River, of 18,500 horsepower, the other plants being in small units.

In addition, since the completion of the Keokuk hydro development on the Mississippi River, 60,000 horsepower has been supplied to the Union Electric Light & Power Co. for distribution in St. Louis, making a total of approximately 82,000 horsepower from hydro-electric plants in service in the state of Missouri.

Permits have been granted by the Federal Power Commission to Walter Cravens for a development on the Osage River, to have an installed capacity of 50,000 horsepower; to the Central Missouri Power & Water Co. for a development on the Gasconade River, to have an installed capacity of 50,000 horsepower; to the Empire District Electric Company for developments on the White and James rivers, to have an installed capacity of 80,000 horsepower, making a total of 180,000 horsepower in proposed developments. Reference should also be made to the proposed developments of 150,000 horsepower in north Arkansas, extending in part into Missouri on the White River and tributaries, noted above, making total developments in this general region of 330,000 horsepower.

Within recent years large steam plants have been erected in the St. Louis and Kansas City districts, the St. Louis plants of the Union Electric Light & Power Co. to have a total installation of 401,000 horsepower, the Kansas City Power & Light Co. of 150,000 horsepower.

Texas

Texas, having 514,000 horsepower available 50 per cent of the time, has but one important hydro plant of 2500 horsepower, located on the Guadalupe River. Surveys have been made of the Pecos and Devils rivers, indicating that 20,000 horsepower could be developed but that the cost would be prohibitive. The Guadalupe River has a total potential horsepower of 50,000 if the San Marcos is included. The Colorado has a larger discharge than the Guadalupe and has important power possibilities. The Brazos, the Trinity and the Upper Pecos are used

for irrigation, though they also have important power possibilities.

It is the view, however, of those acquainted with the situation that, due to the remote location of the hydro possibilities from centers of population and the consequent cost of development and transmission, the extensive lignite deposits, the oil and gas resources and the water-powers will be developed, in the order named, for the supply of energy in that state.

Florida, Mississippi, Louisiana and Oklahoma

There are no hydro developments in utility service in Florida, Mississippi, Louisiana and Oklahoma, except several very small plants, and the topography of the country is such that the power possibilities are quite limited.

There is pending before the Federal Power Commission the application of Public Service Corporation of Oklahoma for a development of 11,000 horsepower on Grand River in Oklahoma, but there do not appear to be any further plans for hydro development in the state mentioned.

Muscle Shoals

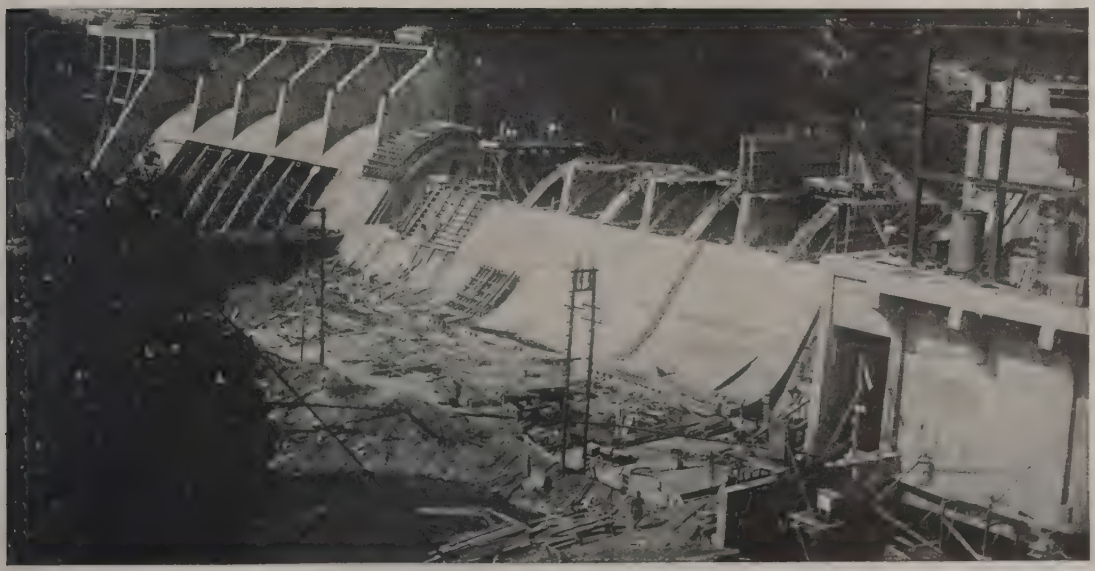
A discussion of hydro-power in the South would be incomplete without reference to Muscle Shoals. From Florence, Ala., to a point within ten miles of Decatur the Tennessee River flows over a series of rapids a distance of about forty miles. The most important of these rapids is Muscle Shoals, where the Government is constructing a power and navigation dam, known as Wilson Dam. Heretofore there was expended at this point about $3,200,000 for locks and canals in aid of navigation. These facilities are inadequate and for several years have not been in use. The minimum flow at Muscle Shoals at Wilson Dam and at the proposed Dam No. 3 immediately above will produce about 150,000 continuous horsepower, with perhaps 300,000 horsepower available eight months in the year. Present plans of the Government, however, contemplates installation of 850,000 horsepower. The drainage area of the Tennessee River exceeds 40,000 square miles and the annual rainfall is from 55 to 60 inches. The result is that at Muscle Shoals for a period of from two to six months of the year the flow is augmented sufficiently to provide for development of from 300,000 to 850,000 horsepower. One of the most important problems connected with the operation of this development is the most economical method by which the very large amount of secondary power can be supplemented with power from other sources to make it prime or constant power and hence usable.

Congress in 1913, and again in 1916, authorized surveys and investigations with a view to the adoption of a plan for improving navigation of the river and the development of power. Recommendations were submitted and approved looking to a co-operative arrangement by which the Government would provide a certain portion of the funds and private capital the remainder. In the meantime, Congress authorized the construction of a nitrate plant to be operated with electric or steam power, in consequence of which no action was taken upon the recommendations made by the Board of Engineers.

Soon after the United States entered the World War the Government constructed two nitrate plants in the vicinity of Muscle Shoals at a cost of $90,000,000, and began the construction of Dam No. 2, or Wilson Dam. Construction work on this dam was suspended soon after the close of the war. No work has been authorized at Dam No. 3, the site and part of the flowage lands being owned by the Alabama Power Company. The investment of the Government in the nitrate and power projects when Dam No. 2 is completed will be about $150,000,000; including Dam No. 3, it will be $180,000,000.

From 1921 to 1924 a number of offers were submitted to the Government to take over and operate all of its properties at Muscle Shoals, and while Congress has not accepted any of these offers or enacted legislation looking to the future operation of the plants, it has provided funds necessary to complete the Wilson Dam and to install electrical equipment capable of generating 240,000 horsepower. It is expected this project will be completed the latter part of 1925.

In November, 1923, the Federal Power Commission



ARKANSAS LIGHT & POWER CO.'S REMMEL DAM AND SPILLWAY UNDER CONSTRUCTION IN ARKANSAS
First Unit of $16,000,000 Hydro-Electric Development Planned to Produce 120,000 Horsepower

WILSON DAM ON TENNESSEE RIVER, GENERAL VIEW OF POWER HOUSE AND DAM FROM SOUTH BANK

requested a number of public-utility companies engaged in the development and distribution of electricity in the Southeastern states to advise upon what terms the Government would dispose of the electric energy that would be available upon the completion of Wilson Dam. In response, nine of these companies operating in five Southern states, whose transmission lines are interconnected, submitted a plan for the purchase or lease of Wilson Dam, operation of the electrical equipment and distribution of the power throughout the territory served by them. In January, 1924, three of these companies submitted a definite offer to the Secretary of War, which was transmitted to Congress, under which it was proposed to organize a company with a capital of $15,000,000 to lease the nitrate plants and also to lease the Wilson Dam power plant for a period of fifty years under the terms of the Federal Water Power Act, and either lease or purchase the 80,000 horsepower steam plant connected with the Muscle Shoals properties. This offer contemplated that the United States would retain title to all of its properties, with reservation for the production of nitrates for purposes of war, provision being made for the manufacture of fertilizer by the lessee, the power not required for these purposes to be distributed to the public through various public-utility companies in the South. The plan submitted contemplates the maximum use of the entire power resources at Muscle Shoals, including valorization of the secondary power from hydro and steam plants, storage reservoirs, etc., of the power companies located in various sections of the South.

The Muscle Shoals developments (including both power plants) will, as stated above, produce 150,000 continuous power, but the developments provide for a total installation of 850,000 horsepower. How can this secondary power be utilized most efficiently in the public interest? It seems clear that this can only be accomplished by having the developments interconnected with the power systems of the Southeast. It is very seldom that there are periods of low water in all sections of the Southeastern states at the same time. At times of low water and depleted storage at power plants in one section there would very probably be an excess of secondary power at Muscle Shoals that could be relayed to other systems. While thus obtaining power from Muscle Shoals, the storage reservoirs of other plants would again fill up. On the other hand, when Muscle Shoals can only produce its primary of 150,000 horsepower, the storage reservoirs of the other companies could be opened and the power development transmitted to the places where needed. This would also mean the conservation of the coal which is now being used very extensively in auxiliary steam plants. It would reduce the use of steam power to a minimum.

Government engineers and engineers in private life

experienced in the problems of water-power development concur in the view that only by such methods can the greatest utilization of the Muscle Shoals power in the interest of the people of the South be attained. It is the deliberate conclusion of those acquainted with growing demands for power in the South that the output at Wilson Dam, other than that which will be required for military and agricultural purposes, will be promptly absorbed, and that if Dam No. 3 is constructed the output of this additional plant can be readily absorbed by power users in the Southern states.

The states of Louisiana and Mississippi and sections of other Southern states now without hydro-power can never hope to enjoy its benefits if power from the Muscle Shoals region, not needed for the productions of nitrates, is not connected with and distributed through transmission lines now existing and others that will soon be built extending over almost the entire length and breadth of the states of North and South Carolina, Tennessee, Georgia, Alabama, Mississippi and Arkansas. Standing alone and operated without co-ordination with systems located in other sections, the Muscle Shoals power of necessity will be limited in amount and therefore can serve only a limited territory. Combined with power resources in other regions, its usable capacity will be greatly increased, and if augmented with surplus power from other watersheds, and from properly located reserve steam plants, will enable Memphis, all western Tennessee, the southern portion of Alabama, southeast Georgia, north and northwest Florida, Louisiana and Mississippi and the intervening territory to be supplied with ample dependable power for domestic and industrial use.

Transmission Lines

The first long-distance transmission of energy by electricity was accomplished in Italy in 1886, when single-phase current was transmitted 17 miles at 2000 volts from the Cherchin-Tivoli steam plant to Rome. The first transmission system in America was built in 1889 at Oregon City, Ore., on the Williamette River. Energy at 4000 volts, single phase, was transmitted 13 miles. In 1893 the Mill Creek (California) plant delivered power 23 miles at 2400 volts, three phase.

The first long-distance transmission line built in the South of which I have record was constructed in South Carolina in 1896 by M. C. Whitner from a small water-power plant on the Catawba River. Others followed in rapid succession, among which should be mentioned the lines constructed in Alabama in 1902 from a water-power plant on the Tallapoosa River to the City of Montgomery, a distance of 30 miles. This line was built for 33,000 volts, three-phase current, and supplied the entire power requirements of Montgomery for many years.

Since these early successes progress has been continuous and rapid until today 110,000-volt lines designed to economically transmit large blocks of power are common, and 220,000-volt lines are in operation for transmitting extremely large blocks of power over a distance of 300 miles.

Transmission lines are expensive, and should be built

ELECTRIC POWER LINES THROUGH AN ALABAMA COTTON FIELD WITH A COTTON MILL BACK OF THE CLUMP OF WOODS, THE INSERT AT THE LEFT SHOWING HOW POWER IS CARRIED UPHILL TO MILLS IN THE DISTANCE

A Substation, Switchhouse and High Tension Structure

and can only be maintained when the market for power will justify their construction, but interconnection between power systems operating in different watersheds often makes possible the extension of transmission lines to sections which would not otherwise justify their construction.

Interconnection or Super-Power

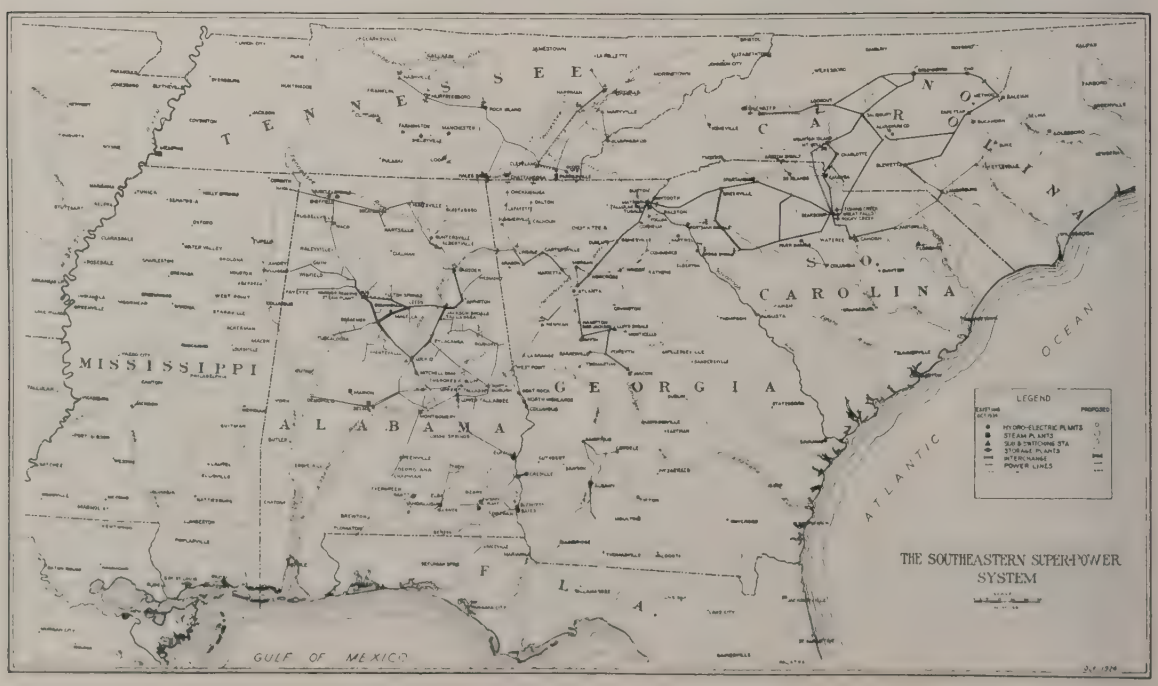
The accompanying map shows how power systems in the Southeast are now interconnected, and possible extensions to other sections.

So much has been written and said in recent years on "Super-Power" that the term is now a catch-word. Its use has led the uninformed to conclude that the immediate connection of any power plants, or the immediate connection of distribution systems, no matter how located, or how loaded, will result in economies in the production and distribution of electrical energy and consequently in a reduction in price. It is unfortunate that this misapprehension has arisen to cloud the subject. The advantages of interconnection between power plants and between systems, when such interconnections are justified on economic grounds, are many and marked. Though the general public has only begun to realize something of the value of interconnections, and though the non-technical magazines and newspapers have begun recently to publish articles on different phases of the subject, the basic work of the interconnection of hydro plants was done many years ago by engineers of the public-utility companies and is in progress on a purely economic basis almost from day to day.

These interconnections are not new or novel; they are the result of normal economic growth; they will continue until vast sections of our country are covered by high-tension transmission lines carrying electrical energy at 110,000 volts, 220,000 volts, or even at higher voltages, as the art progresses and the demand increases.

The first interconnection of any importance in the South the result of normal economic growth; they will continue Railway & Power Co. in the state of Georgia and the Southern Power Company in the state of North Carolina. On the completion in 1914 of a large hydro-electric development at Tallulah Falls in north Georgia, the demand for power of the Georgia Railway & Power Co. was not sufficient to absorb the entire output of this plant, and consequently a connecting line was built permitting the transfer of surplus power to North and South Carolina. This, the first connection between two major power companies, is typical of one of the reasons for interconnection. It permitted energy which would otherwise be wasted to be utilized in the factories and homes of the Carolinas.

Another interconnecting line was built from the Georgia Railway & Power Co.'s system near Atlanta to the Central Georgia Power Company's system at Macon in order to deliver to Atlanta surplus power from a development at Lloyd Shoals, near Macon. Connecting lines were also built between the Columbus Power Company of Columbus, Ga., and the Georgia Railway & Power Co. and the Tennessee Electric Power Company in Tennessee. In North Carolina a connecting line was installed between Raleigh and Greensboro, and later a line was constructed in South Carolina, and lines were later built connecting the lines



of the Alabama Power Company with both the Georgia Railway & Power Co. and the Columbus Electric Power Company.

Connections are planned for the immediate future between lines in North Carolina and Virginia and between Virginia and West Virginia, and recent announcements state that the power lines between all of the principal systems in West Virginia and Pennsylvania will shortly be connected.

The public importance of great interconnected power systems, whether in times of war or of peace, has just begun to be recognized, and too much cannot be said of the efforts and statesmanship views of the Hon. Herbert Hoover, the Secretary of Commerce, which culminated in the recent report of the Northeast Super-Power Committee, to bring about interconnection from Virginia to Niagara Falls, including the entire New England area.

It has been said by Prof. Thorndyke Saville of the University of North Carolina, one of the most profound students of this question in the South, that:

> "The ability to interchange power among the various Southern Appalachian states is one of the principal factors affecting the low rates for electrical energy obtaining in these states, and in turn this attracts industrial development. A striking instance of such interchange was afforded in the fall of 1921 and 1922 when the Carolina Power & Light Company's plants suffered diminished output from severe drouth. An arrangement was effected whereby the steam plant of the United States Government at Sheffield, Ala., was leased for the use of power companies in the Southeastern zone. The output of this plant being used in Alabama made possible transmission of an equivalent amount of energy to Georgia, where it was used. The same amount of energy from Georgia plants was sent into the Southern Power Company's system in North Carolina, from which an equivalent amount was finally transmitted to the Carolina Power & Light Company. The total distance over which this interchange took place was nearly 1100 miles. No interchange of power on such a large scale over such a distance is possible anywhere else east of the Rocky Mountains." Circular No. 6 of North Carolina Geological and Economic Survey, p. 18.

A study of the power situation in the South shows that in 1923 there was produced 7,800,000,000 kilowatt hours of electrical energy, of which 4,000,000,000 kilowatt hours, or approximately 50 per cent, was produced by water-driven generators, the capacity in developed water-power being 1,673,126 horsepower.

As previously shown, the total potential water-power available 90 per cent of the time is 3,983,000 horsepower, and this may be increased to 7,500,000 horsepower available 50 per cent of the time, according to published reports of the United States Geological Survey of April 29, 1924.

Thus there is now developed about 40 per cent of the total primary power ultimately available in this area, or 20 per cent of the power available 50 per cent of the time.

In the five states of North Carolina, South Carolina, Georgia, Tennessee and Alabama, 60 per cent of the available primary and about 40 per cent of that available 50 per cent of the time has been developed.

Further interconnection will make possible the use of secondary power which arises from the seasonal flow of streams, and thus bring into practical use a larger quantity of power than will otherwise be possible.

In 1923 the interconnected companies in the Southeast exchanged a total of 236,600,000 kilowatt hours, a volume of power that would have required a large additional investment at different places to produce; but, due to engineering skill and foresight, this investment is saved by the interconnection of the systems.

It should also be borne in mind that the economical generation and distribution of power vitally requires that it be produced in large plants. Industry, both large and small, demands ever-increasing volumes of power at reasonable rates in order to successfully compete in the markets of the world, and this will be best accomplished by the use of power produced by large central stations.

Super-power, giant-power, interconnection, regional supply, or whatever one may call it, is a thing to be evolved rather than to be suddenly created. It is but the application of economic laws. It permits the utilization of power sites otherwise too small for development and operation alone. The deficiency is supplied from steam reserves, storage and other sources. Interconnection reduces reserve equipment, improves the average load factor, provides more security in power supply, and permits the most advantageous use of the combination of water and steam power. It takes advantage of the variation in stream flow in different states. It effects a saving in power equipment, a reduction in investment, capital and operating expenses, and makes possible the distribution of power to wider areas at lower cost to the consumers. It stabilizes rates throughout the territory and decentralizes industry. It increases the ability of the power companies to serve the purposes of mankind, whether on the farm, in the home, in the factory or for operation of street and railway systems. The power companies may thus pour their energy from every source into a common pool from which it can be drawn at any point and be put to the greatest use.

Interconnected distribution systems and transmission lines fed from many hydro and steam electric plants forming an immense reservoir of power, spreading over the South, will provide abundant dependable sources of electricity which will perform many burdensome tasks, conserve human labor, create prosperity and administer to the comfort and happiness of millions of people.

A group of companies with distribution systems and connection lines essential to a super-power zone does not imply that a combination must control the generation and distribution of power within the territory served any more than does the physical connection of different railroad systems making it possible for one to travel across the continent without change of cars implies that the continuous line of travel must be under one control and management. Each company is independent, assumes a duty to its own customers, provides its own management, adopts and pursues its own policies, attends to its own financial affairs and is subject to the public authority where it operates as to rates and service and security issues. The component companies merely draw from and contribute surplus energy to others which otherwise would go to waste and benefit no one.

It is the duty of those in the industry who must supply present and future demands for power to warn the public that our power resources will fail in their maximum service if any of the important waters-powers of the South or of the country are not made a part of an interconnected system, which, through expansion and perfection, is destined to exercise a profound influence upon the future growth and prosperity of the nation.

Progress of Development Since Passage of Federal Power Law

Water-power development did not go forward on the navigable streams and their important tributaries in this country, with the exception of a very few projects

authorized by special acts of Congress, until after the passage in 1920 of the Federal Water-Power Act. This legislation was the result of more than fifteen years' effort. There were those who sought the enactment of laws that would attract and justify the very large initial capital required for building hydro-electric plants and distribution systems, and there were those who sought to impose restrictions and limitations which would have prevented any development whatever.

Although science had made wonderful advances in the art of generating and distributing electricity, and its uses had multiplied a hundred-fold, the opportunity for the application of these advances had been retarded in a large measure because of the absence of authority under which the water in our streams could be harnessed and made to serve the needs of a growing, throbbing civilization. Different bills passed the House and the Senate in the Congress of the United States, but their provisions could not be reconciled between the conflicting views of the two bodies. Finally, a national policy with regard to developing and conserving water-power on navigable streams and on the public domain was approved and is contained in the present Federal Water-Power Act of June 10, 1920, under which wonderful progress has been made within the last four years.

Only 1,400,000 horsepower had been constructed under Federal authority in all the years preceding the enactment of the Water-Power Act, and at the time of the passage of the act the aggregate installation in all water-power plants in the United States amounted to only 9,000,000 horsepower. To July 1, 1924, within a period of four years after the passage of the act, plants have been built, or are building, under license of the Federal Power Commission which will have a total installed capacity of 2,741,547 horsepower, and of this total it should be noted that 301,500 horsepower is located in the South.

But, in addition to the above figures, applications for preliminary permits were pending on July 1, 1924, before the Federal Power Commission or licenses to develop water-powers in the South, still waiting action by the Federal Power Commission before July 1, 1924, for no less than 2,417,550 horsepower, ranging from a little local plant of 250 horsepower up to the proposed 600,000 horsepower installation on the Cheat River. Some of these will be granted from time to time as the work of investigation by the Commission goes on and on. Furthermore, since July 1, 1924, applications have been received, and hydro-electric projects are pending before the Commission, representing 377,400 horsepower in the Southern states, making a total of 3,096,450 horsepower involved in licenses or applications before the Federal Power Commission. Beyond this there are projects pending in the South which are not under Federal control, but in total they will not exceed 500,000 horsepower. Thus it is seen that the water-powers of the South are very largely under Federal jurisdiction.

This law is a settled national policy. It is being fairly administered. It has been accepted by the public and those engaged in the industry, notwithstanding its restric-

TYPES OF STEAM POWER ELECTRIC PLANTS IN THE SOUTH

1. Gadsden (Ala.) Steam Plant. 2. Gorgas Steam Plant of the Alabama Power Co. 3. Power-House of the Consolidated Gas, Electric Light & Power Co., Baltimore. 4. Tampa (Fla.) Electric Co.

tions and limitations on developers. It is unfortunate that from some quarters there comes a suggestion that other and additional legislation is required.

This suggestion has come mainly from those who are seeking valuable water-powers, but who desire to be relieved of the restrictions and limitations of the act made obviously in the public interest.

Unfortunately, as is too frequently the case, the public is unaware of the many wholesome and carefully adjusted provisions of the law which safeguards the interests not only of the Government but of the public. It furnishes reasonable protection to those whose investments provide the funds necessary to construct, operate and maintain hydro-electric systems. Except where power is developed for private industrial use, the law provides for thorough public regulation under local state commissions of prices at which electricity is sold; it regulates the profits that may be made and secures the privilege of recapturing the entire power project at any time during the fifty-year franchise period, or at the end thereof, upon terms that are highly favorable to the public. Any other restrictions for utilizing the water-power of the nation would be unjust to developers and a virtual denial of the right to the use and benefit of water-power development, and on the other hand any relaxation of these restrictions in the interest of a special class would be unfair to the public and unjust to others who are proceeding under the act.

Only two courses are open to those who agitate for new or additional legislation concerning water-powers in this country—namely, to repeal the law and arrest development altogether, or resort to the very dangerous and hazardous expedient of public ownership and operation, with all the evils which experience has amply demonstrated attend the participation of Government, whether local, state or Federal, in the conduct of business enterprises which properly should be left to individual initiative of the private citizen.

Hydro-electric development in the South and everywhere else in the United States would be brought to a standstill by the adoption of either of these two courses. The repeal of the Federal Water-Power Act would re-establish the condition existing prior to its enactment—namely, no authority anywhere in the Government outside of Congress to permit the use of navigable streams or public lands for hydro-electric development. To await the action of Congress in each special case would prove again, as in the past, impracticable. The cost of hydro-electric works invariably runs into the millions, and such vast sums cannot be held in idleness pending the long controveries in Congress over the details of each grant of authority. Under such circumstances responsible parties, except in very exceptional cases, were and again would be unwilling to apply. Thus Congress, when it finally acted, would too often find its efforts futile, no development resulting. The decade prior to the enactment of the Federal water-power law was replete with instances of this character.

Government ownership and operation schemes, on the other hand, give no promise of water-power development. The most casual student of public affairs must realize that the Government cannot be induced to undertake such a policy. It does not conform to American ideas. In this country it is customary to depend for economic and industrial development on the capacity, energy and initiative of individual citizens. Regulation of economic and industrial forces is a part of the American system, but direct action by the Government is not. This is settled policy, never departed from by the Federal Government and seldom by any of the states. Can it be conceived as possible that this policy could be changed in a decade or a generation? Yet water-power development, if it is to go forward to meet the demands of industrial growth, must not be delayed a single year, much less a long period of years. Even if grave considerations of public policy were not involved, public funds for such purposes are not available, and could not be made available, for many years to come. The spirit of the times is for curtailment of public expenditures, not for expansion. Taxes are to be reduced, not increased. The necessary costs of the war period and the obligations resulting from the war have committed the country to extraordinary burdens which the wisest and most prudent administration cannot relieve. These must be borne, but they exclude the possibility of new forms of expenditure. Under the existing water-power law, and without the expenditure of a dollar of the tax payer's money, many millions of developed electric horsepower from the streams of the country can be added to the national resources within the next few years. The industrial demand for this development is insistent. No policy could be more reactionary or fatal than the repeal of the water-power law or dependence on Government ownership schemes impossible of fulfilment.

Electricity for the Farmer

The problem of supplying the demands of the farmer for electricity is similar to that which confronted the industrial plants and the power companies twenty years ago. The cost for lines and service to rural communities is necessarily high compared to the revenue. Few farm implements now lend themselves to electrification. There are reasons to hope that these difficulties will be overcome as the difficulties confronting the industries twenty years ago have been overcome. Much thought has been given by electric public utilities to the problems involved in the extension of customer service lines from the nearby cities and towns with the view that the farmer may use electricity to lighten labor, decrease the help problem, and make easier and more profitable farm and farmhouse activities.

A national committee, known as the Committee on the Relation of Electricity to Agriculture, with representatives from the National Electric Light Association, the American Farm Bureau Federation, American Society of Agricultural Engineers, the United States Departments of Agriculture, Commerce and Interior, has been formed to study and investigate this problem. The Department of Agriculture, in co-operation with manufacturers of electrical and farm equipment and the other bodies mentioned, has near completion the most complete survey of the farm power problem which has ever been attempted.

In the South the Alabama Power Company has constructed more than seventy-one miles of rural lines, serving approximately 1000 farm customers. This company, in co-operation with local committees of farmers under the direction of the Agricultural Engineering Department of the Alabama Polytechnic Institute, is conducting an elaborate series of experiments to determine if farmers engaged in various lines of agriculture can profitably use electrical energy in farm work.

Benefits to Farmers Through Industrial Development

Electricity will not be a cure-all for the various ills which at present afflict farm life, but intelligent distribution and use of electrical power on the farm should lessen drudgery, make farm life more attractive and increase production per man.

The diversified use and distribution of power provides

an indirect benefit to the rural sections more than is generally understood through the location of industrial plants outside congested centers of population. No well-balanced agriculture is possible in the South except as it goes hand in hand with industrial development. The South has too large an agricultural population in proportion to the number engaged in industrial pursuits. Until its manufacturing interests are more largely developed there can be no well-rounded, diversified agricultural development. A local market for diversified products is essential. Every cotton mill, every mine, every furnace, every industry established creates a demand for the produce of the farm.

Hydro-electric power in some instances will be the deciding factor in maintaining a stable population in our rural sections, and all that that means to states vitally dependent upon the increase of self-supporting farm homes. The industries referred to will depend largely for their economic operation on whether or not the mill or factory is surrounded by a stable population and whether there are cheap foodstuffs to be had in the vicinity. This will be assured only by making the farm-owned home as attractive as the mill-owned home. To have this stable population located near the mills on cultivatable land and to have the factory surrounded by well-tilled farms is thus industrially desirable as well as important from the social and political aspect. The farms help the mill and the mill helps the farms. They reduce the labor turnover and keep down the cost of transportation of perishable food. It is axiomatic that the farm must become in time a plant as dependent on electric power as the factory.

Labor

A great factor in the industrial progress of the South is the quality and quantity of the labor supply. The bulk of the white population is predominantly English, Scotch-Irish and Welsh in origin. It is perhaps more truly American than the population of any other part of our country. It is characterized by reliability, industry, tractability and high intelligence.

The South's population is preponderantly native born. The lowest proportion of foreign stock in any section of the United States is found in the South, which has but 8 per cent of foreign stock and only 2.7 per cent of its white population foreign born. The executives in Southern industry, the clerical men and the white manual workmen have the same blood and, except for differences of environment, the same ideals. They understand one another and work and live together in harmony.

The inhabitants of mountain sections have proven to be excellent cotton-mill operatives; they have a hereditary affinity for industrial pursuits. At one time, prior to the Civil War, the manufactured products of Virginia, the Carolinas and Georgia exceeded in variety and value those of the entire New England states. However, by Whitney's invention, cotton planting became so profitable that factories were abandoned, the owners becoming planters and using slave labor. Many of the working whites migrated to the middle West, but the bulk of them, clinging tenaciously to home ties, were left stranded by the receding industrial tide, driven farther and farther back into the hills; thus many of the industrial workers of 1800 became the mountain farmers of 1850; their poverty and segregation came simply from lack of opportunity.

When the abolition of slavery lifted the bar to industrial progress in the South, these people who had deserted manufacturing for precarious agriculture went back again to the pursuits of their fathers. The foothills and mountains became the reservoir for factories requiring skilled labor of high intelligence. As fast as factories were started, forces of labor were recruited from the foothills and mountain country to operate them. It was found that the descendants of the industrial workers of 1800 could, with little training do as good work as their forebears. They were not naturally farmers, and they returned to manufacturing not only to relieve their wants and to improve their conditions, but as a sort of "joyful occupation to which they were particularly well suited by heritage."

The heritage of the South's population was nurtured by necessity, the sternest of all teachers. Because of isolation on the mountain farms of the South, the hand loom and the spinning wheel became the source of the coarser goods used on the plantations. It was estimated by Mr. Atkinson in the Quarterly Journal of Economics that one-half of the South's population was clothed in homespuns at the beginning of the War Between the States. Many of the agriculturists devoted a part of their time between crop-growing seasons to home industry. It is noted by students of this earlier period that one important result has been training in the handling of threads, which has fitted many of the mountain people to be factory operatives.

Customer Ownership of Public Utilities in the South

The outstanding feature of public-utility finance has been the recent growth in customer ownership. The construction program of the electric light and power utilities of the United States called for an expenditure of $750,000,000 in 1923, of which $250,000,000, or 33 per cent, was raised by the sale of securities to customers of these companies.

In the South the public-utility power companies have 78,098 customers as shareholders, owning approximately $60,000,000 of the securities of the companies which furnish them light and power. This movement in recent years has not only included the customers but the employes as well, and it may truly be said that the utilities that take their customers and employes into this form of partnership are more nearly measuring up to their public obligations in every way to the great advantage of both parties and to the advantage of the communities. The advantages of customer ownership are economic, financial and social. It is the only practical form of public ownership. The owner customers have a share in the management and a share in the profits of their company, yet the selection of the management is wholly divorced from politics. Customer ownership permits people of small means to invest savings in safe, sound securities, about which facts are easily ascertained; it encourages thrift and rewards the thrifty with greater returns than other equally safe forms of investment, fosters a spirit of fairness in the public mind and protects the utility from unwarranted political attacks.

Customer ownership stabilizes the public-utility business. A utility has a very direct responsibility to its customer owners no less than to the public; its management must consider them in all its physical and financial plans, and must endeavor to provide adequate service to the community of which they form a part, and conserve the interest of its customers. Bonds and stocks sold to customers must be legally and financially sound; the properties on which they are issued must have a substantial earning power. Customer owners form a body of critics in very close touch with the business of a utility and the public; they are a direct check on the management. Customer ownership builds up and maintains good will and sound public relations essential to the success of every public

SOME OF THE USES OF HYDRO-ELECTRIC POWER

utility. It stimulates friendly interest in and development of home industries.

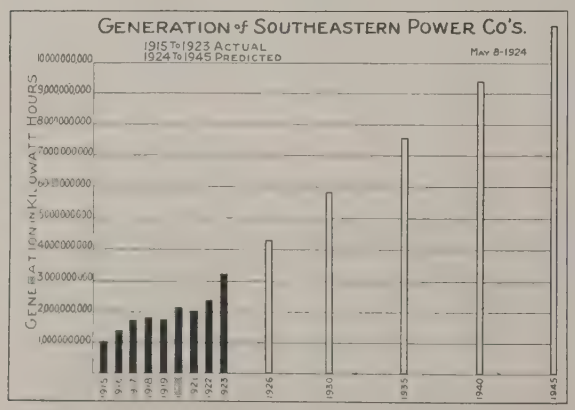
Future Demand for Power

While no extensive detailed power survey of the entire South has been attempted, public-utility power companies, both large and small, have made and are extending their own surveys and investigations to determine how best to conserve the water-power resources in the region and secure the most comprehensive and economical development to meet future demands for power. Within that territory, commonly called the Southeastern power zone, there has been a most exhaustive study of the future demand for power and the means for providing it. In furtherance of the general plan of conserving the water-power resources of the South, the power companies recently completed a survey of the existing facilities and future requirements to meet the growing demands for the next ten years. The work was followed by the building of additional connection lines, and the building of plants at points where the power could be best utilized in the interest of the public. The result is the present super-power zone of the South, about which so much has been said and written. Possibly, therefore, more benefit has come to the power-consuming public of the South as a result of this survey than any one step which has been taken by Southern power companies.

It was estimated in the survey mentioned that the normal growth of the region served by the seven major power companies will require an additional generation of about 370,000,000 kilowatt hours each year, and that they must generate 7,000,000,000 kilowatt hours in 1933, or more than one-seventh of the output of all electrical power stations of the United States in 1923.

This estimate does not include the other areas in the Southern states that are without local hydro-power resources but which should be ultimately served by interconnected transmission lines, nor does it include any power for railroad electrification.

The accompanying chart shows the generation in kilowatt hours in the past and the estimated generation necessary for the coming twenty years of seven Southeastern companies. Each of these companies has new plants under



construction and future developments planned to meet this tremendous demand for electric energy so essential to modern industrial and civic life.

The public utilities are making elaborate and costly studies to determine the direction, the sequence of their future construction program, and some have made plans covering their construction program for fifteen years. Studies of rainfall, stream flow, present and future power demands for power, the location of these demands and surveys of natural resources and their economic utilization are being conducted under the direction of the best engineering talent. Such studies must be continuous and part of a co-ordinated plan to determine the natural and the logical sequence of water-power development, the sites that should be first developed, and how they should be constructed so as not to destroy future possibilities for power on the same stream. Only by such studies, conducted for long periods by those best acquainted with the problems, can the South reap the full benefits from its water-power resources.

Enough is known of the rate of increase in the demand for electrical energy to enable us to say with certainty that all available water-power sites must be developed, new steam electric power plants built for continuous operation and the very fullest use made of interconnection between systems with plants located on different watersheds to enable the industry to meet the demand for service which is coming to it.

Hydro-electric power, as it can now be transmitted, it is believed will result in the decentralization of industry to some extent and the building up of country districts with small plants in villages and on the farm to the great benefit of civilization.

Summary

In the South, within the last twenty years, increasing uses and wider application of electricity to the activities of our everyday life has equaled, if not surpassed, that of any other section of the country. Within the borders of these states are streams and coal deposits sufficient to produce abundant and economical sources of electrical energy, if systematically and wisely developed, to serve the future needs of a great industrial and agricultural empire. To anticipate the future and adequately meet the demand that is sure to come challenges the patriotism and business judgment, not only of those whose duty as public-utility power executives it is to do their part, but of the public itself, which must recognize that public utility companies are entitled to and must have fair treatment.

It will be necessary ultimately to develop every available water-power resource, augmented by storage reservoirs and steam plants located in different sections of this entire region. The energy thus created must be absorbed into and distributed from a network of interconnected transmission lines extending into every section of the South. Only by such co-ordination and a friendly spirit of co-operation will it be possible for the farmers of the South and people in small towns and villages to enjoy the benefits of electrical current on a parity with those who live in larger centers of population. Only by wide distribution of power through interconnection can the small town and remote communities attract industry, or can industry take advantage of better living and sanitary conditions which are possible in sections outside densely populated localities.

Confronted with a steady industrial growth, the necessity for additional power, the projection of transmission lines and distribution systems into districts now without central station power, public-utility power companies are ready to anticipate rather than await the future demand for power in the onward march of the South to industrial and agricultural independence.

Facts regarding Southern resources and the rapidity of their development, as given in the Manufacturers Record and annually summed up in its "Blue Book of Southern Progress," indicate growth which will require a great increase in hydro-electric power.

The South Built the First Railroads in America

History of Railroad Development in this Section from 1826 to 1924

By Samuel G. Wilmer, Railroad Editor of the Manufacturers Record

In the building and development of railroads on the North American Continent the South took the lead, and it can be truthfully said that this section was the birthplace of railroad service in the United States, for while there was a little stone-quarry railroad at Quincy, Mass., and a coal-mine railroad at Honesdale, Pa., which were the very first lines of any kind in America, they were used only in their owners' business and not as common carriers; and although the owner of the mines, the Delaware & Hudson Canal Co., tried to use an English-built engine, the first real locomotive seen in this country, it was immediately discarded because it was too heavy for the track, and was no more employed for a long time. On the other hand, the Baltimore & Ohio Railroad in Maryland, which was the first rail common carrier in operation in America, and the Charleston & Hamburg Railroad in South Carolina, the immediate second, had their roads open to public use from the beginning.

Samuel G. Wilmer

In its construction the South Carolina line advanced more rapidly than the other, which was due in part to the more level character of the country that it traversed and freedom from competition, whereas the Maryland line, besides traversing rough country, had to combat the opposition of the Chesapeake & Ohio Canal Co., which had begun the construction of its waterway from Georgetown, D. C., to Cumberland, Md. It thus came about that South Carolina possessed the first railroad of more than 100 miles length—the Charleston & Hamburg line, afterwards called South Carolina Railroad and now part of the Southern Railway Company's system—which was entirely completed in the autumn of 1833 to Hamburg, S. C., on the Savannah River, opposite Augusta, Ga., 136 miles from Charleston. At this time the Baltimore & Ohio Railroad was only 70 miles long from Baltimore to Point of Rocks, Md., and not until 1842, when the latter was opened to Cumberland, Md., 179 miles from Baltimore, did it exceed the length of the South Carolina line.

This comparatively short railroad in South Carolina also used in regular service the first practical locomotive built in this country, the Best Friend—they gave locomotives names in those days, a practice that still persists in England. It was designed by E. L. Miller of Charleston, and was built at the West Point Foundry in New York city in 1830, the engine being delivered by boat at Charleston in the fall of that year. Just before this engine was constructed, Peter Cooper of New York built and demonstrated on the Baltimore & Ohio Railroad a locomotive which was nothing more than a large working model. It ran in competition with the horse-drawn cars with which the line was then operated from Baltimore to Ellicott's Mills (now Ellicott City), but this engine was too small for anything except to demonstrate the practicality of steam power for locomotion. It was not until the summer of 1831 that this road had a regular locomotive, named the York, having been built at York, Pa., by Davis & Gartner, a member of which firm, Phineas Davis, later became head of the railroad company's machinery department at Baltimore.

In consequence of this early impetus given in the South to the development of railroads in America, other railroad builders in this country for several years were accustomed to refer to one or the other of these two railroads, as to a text book, for information concerning what was best in construction and equipment as well as in operation. The early days of the Baltimore & Ohio have been referred to by railroad men of experience as "a university of transportation." How true this was and is, may be realized by a brief review of some outstanding facts.

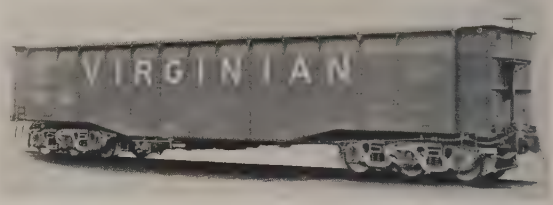
Philip E. Thomas and George Brown of Baltimore, in 1826, took the first steps toward the building of the first common-carrier railroad in the United States—the Baltimore & Ohio Rail Road. The words rail and road had not then been joined in a single word as now, but the term "rail road" was used to distinguish the line from a turnpike road, as toll highways were known before they came to be called "turnpikes" for short. A charter was obtained early in 1827, and on May 24, 1830, the company began running horse cars to and from Ellicott's Mills, one of the two tracks having been completed. From then on there were developed on this line the type of railroad track which is now in general use, the long passenger car with middle aisle that is standard in this country and in some others, and the outside journal box for car axles—which were invented by Ross Winans—the first sleeping cars, the first all-metal freight cars—iron being used for both box cars and coal cars—the first high-powered freight engines, and

FIRST AMERICAN LOCOMOTIVE PULLING FIRST TRAIN ON CHARLESTON & HAMBURG LINE, NOW PART OF SOUTHERN RAILWAY SYSTEM

many other features of tracks and equipment that have become familiar. The first use of the electric telegraph for train orders was also on this road, S. F. B. Morse, the inventor thereof, having obtained from the railroad company, in 1844, authority to build his first line from Baltimore to Washington on the railroad right of way.

The first construction and use of sleeping cars, some years before George M. Pullman built his first car, the Pioneer is also particularly interesting, as it shows the early demand for comfort in night travel, something better than old stage-coach conditions, when one wrapped himself up in a big traveling shawl and slumbered fitfully in his seat. An old record of the Baltimore & Ohio Railroad says that on June 14, 1854, "a model of a seat invented by Mr. Holmes for the accommodation of night travel was shown to the board of directors, and a car was ordered fitted up with such seats." This was the beginning of the modern "sleeper," but in 1857 sleeping cars existed, for an account of an excursion written by an officer of the road mentions their use one night during a stop-over at Grafton, W. Va. In the same narrative is also contained a brief description of a car on the Ohio & Mississippi Railroad between Cincinnati and St. Louis, which says: "The rear car of the first train, in which were the families of the directors of the road, seemed something new in the history of railroad traveling. It was fitted up in four compartments, in each of which were two sofas, each sofa seating two persons and being capable of transformation into berths for the same number. Several ordinary car chairs in addition made the numerical accommodations about one-third as large as those of ordinary cars. There were also a washroom and toilet table in the car, and a patent heating furnace which had the faculty of keeping out the dust and of cooling the air. With rich upholstery and elegant painting, these characteristics made the car one of extraordinary comfort for the traveler so fortunate as to secure one of its seats." This, of course, was something special; the regular sleeping cars did not have more than bunks such as are found now in caboose cars, etc.

Not only did the South keep in the lead of railroad development in the early days, but it has maintained a like position of late years, being the first section of the country to adopt coal cars of very great capacity, those of 120 tons, and also the first to adopt unusually big locomotives for hauling long trains of coal. Thus the South today has not only the largest of freight cars but the largest and most powerful locomotives, while in at least two of its prominent lines—the Virginian Railway and the Carolina, Clinchfield & Ohio Railway—it was neck and neck with the leaders of progress in the lowering of grades to permit the most economical handling of freight traffic. In the adoption of electric motive power, first on the Baltimore & Ohio Railroad Belt Line at Baltimore in 1895 and twenty years later on the Norfolk & Western Railway between Bluefield and Vivian, W. Va., the South also set the pace in moving heavy traffic by the use of this most up-to-date energy, which the Virginian Railway is now installing on part of its line, and which is conspicuous for its use on 650 miles of continuous trunk-line railroad on the St. Paul system in the distant Northwest,



All-Steel Car, Capacity 120 Tons of Coal—Length Over All 50 Feet—Height 11 Feet

as well as for suburban service on the Illinois Central, the Pennsylvania, the New York Central and other systems.

In this connection it should also be noted that the first use of electric power for the conveyance of passengers on a street railway was in 1885 on the Woodberry & Hampden horse-car line in the suburbs of Baltimore, where three electric locomotives, invented by Leo Daft, regularly pulled horse cars over the line. A third rail was used to carry the electric current, except at curves, where a crude trolley construction overhead was employed. The first use of modern trolley cars was at Richmond, Va., in 1888, Frank J. Sprague making the initial installation.

In the construction of the big Union Station at Washington the South also possesses an improved type of passenger railroad depot that is designed to accommodate expansion of traffic which may suddenly occur, as on Inauguration Day or other special occasions, and which it would not be so difficult to enlarge should it become necessary to have greater facilities for regular use. The umbrella type platforms, used instead of an enormous train shed, makes enlargement simple and comparatively inexpensive.

When the state of general advancement in this country at the time railroads were begun is taken into considera-

LARGEST LOCOMOTIVE IN THE WORLD—24 WHEELS UNDER THE ENGINE ALONE, 20 OF THEM BEING DRIVING WHEELS —USED IN COAL TRAFFIC SERVICE WITH CARS OF 120 TONS CAPACITY—ENGINE AND TENDER OVER 100 FEET LONG—WEIGHT OF ENGINE ALONE 342 TONS AND TENDFR OVER 107 TONS—TOTAL 898,300 POUNDS

tion, one is more and more impressed by the evidence of courage, faith and vision possessed by their projectors, and especially by those in the South. For instance, the Baltimore men announced at the outset their intention to construct a "double railroad," meaning a double-tracked line, from Baltimore to the Ohio River, which route caused it to be named Baltimore & Ohio. Old pictures of the first section of the road show that there were two tracks in use from Baltimore to Ellicott's Mills, 15 miles, and soon afterwards Peter Cooper's locomotive-engine, as they called it then, proved the superiority of steam power to that of horses.

Construction of this line along the valley of the Patapsco River was necessarily difficult because of the hilly and rocky country. The roadbed had to be established on a narrow shelf between the lofty rocks on one side and the river bank on the other, and the traveler even of today wonders at the engineering skill of those times and also at the capacity of contractors who did so much without the advantages of modern machinery to aid them in prosecuting their work.

The great stone viaduct at Relay, 9 miles from Baltimore—which station was so called because it was there that relays of horses were kept when horse-drawn cars were running to and from Ellicott's Mills—is another marvel of engineering. It was built between 1833 and 1835, when the Washington Branch was constructed, and it was so well designed and so strongly executed that it continues in constant use today with the heaviest of locomotives and cars running over it. It is as staunch as the everlasting hills on either side of the river. The track is 66 feet above water level, and there are eight arches of 58 feet span which compose the viaduct that was built at the beginning for two tracks and is so maintained today. It is also particularly remarkable that this is a curved bridge, the railroad making a pronounced bend as it goes over the Patapsco. The bridge was named Thomas Viaduct in memory of Philip Evan Thomas, the first president of the road, and a monument built by the contractor, John H. McCartney, records this and other facts. It was designed by Benjamin H. Latrobe, construction engineer of the road, as were the Carroll Viaduct at the edge of Baltimore over Gwynn's Falls, and named for Charles Carroll of Carrollton; the stone bridge at Cumberland, and sundry other viaducts on the main line.

Accustomed as we are to the standard gauge of railroad tracks, it is difficult to realize that at the beginning there was not a little difference of opinion about the width of track between the rails. All early railroads in America were built of either 4 feet 8½ or 9 inch gauge, probably because locomotives imported from England were of that gauge, which was used there and which is now common throughout this country. On account of this difference of one-half inch in the standard gauge very many cars were made with their wheels spaced to fit 4-foot-8½-inch track, but the tread of the wheels was made wide, or "broad tread," to use the technical term, so that they could run successfully on 4-foot-9-inch track without danger of derailment. The specifications for the first locomotive contract on record provided that the flanges of the wheels of the engine should be spaced 4 feet 7½ inches apart from outside to outside, which would give them ample play to turn curves on a track of a little wider gauge than that.

But there came about some demand for a broader gauge of track than this, and several railroads were constructed, particularly in the South, with a gauge of 5 feet or more, but the Ohio & Mississippi Railroad, which is now the Baltimore & Ohio's line from Cincinnati to St. Louis, was of 6-foot gauge, while the Erie Railroad in New York was also 6 feet. In the South, notably, special mechanisms were provided where roads of different gauges met so that cars could be run through by shifting trucks from under them and substituting trucks of another gauge. The use of track of 5-foot gauge continued until May 30, 1886, when by general agreement the standard gauge was put in use on all lines that did not have it before.

There was also great difference of opinion as to the type of track best suited to railroads, and before railroad builders settled down to the spiking of rails directly to wooden ties as the best practice there were various types of track tried and proved to be unsuitable. Thus there was found on the Baltimore & Ohio Railroad at one time, forming different portions of its line, granite blocks with iron rails, combined wood and iron rails on stone blocks, combined wood and iron rails on wooden sleepers supported by broken stone, combined wood and iron rails resting on wooden sleepers supported by longitudinal ground sills instead of broken stone, log and iron rails (merely trunks of trees made smooth on one side for the iron to be spiked to them) and supported on wooden sleepers, and wrought-iron rails like those in use in England. In 1832 these various types of track constituted different parts of the line, and as late as 1875 or 1880 there remained in South Paca street, in Baltimore, longitudinal stone blocks on which there had once been rails for a warehouse track.

At first tracks were built by laying either wood or stone crossties with longitudinal wooden rails on which were spiked flat iron rails 2½ inches or more wide and from one-half to five-eighths of an inch thick, the heads of the nails or spikes being countersunk in the iron rails to make a smooth-running surface. This proved to be a dangerous mode of construction, because after the track had been used a while the end of a rail would occasionally become loose, curve upwards and break through the floor of a car, causing injury to either passengers or freight. These upturned ends of rails were commonly called "snake heads," and this original method of track building was soon abandoned. In some instances iron rails were secured directly to stone blocks laid longitudinally without crossties and sunk in the ground to gauge, but experience soon demonstrated the general advantages of having the rails spiked directly to wooden crossties, affording a track that was not only cheaper to build, but much more practical in use because of its resiliency, and this is the type of track used today. Rails were very light in the early days, but step by step and year after year their weight increased, until now the standard rails on some of the busiest parts of trunk lines weigh 130 pounds or more per linear yard. Iron rails went gradually out of use, being superseded by those made by the Bessemer steel process, which has of late years given way before the improved open-hearth process, so that practically all rails are now made by the latter method. All of these successive advances saw their first uses on lines in the South.

As already remarked, it was Ross Winans of Baltimore who was responsible for the present ordinary type of railroad passenger car. The first passenger cars were not much larger than a heavy stage coach, which they resembled, and they had only four wheels. Enlargements of this pattern resulted in putting together several of these stage-coach type car bodies upon a framework with four wheels more widely spaced. But the need of a larger and different kind of car for efficient railroad service became apparent in the first two or three years of actual railroad operation, and the result was that Mr. Winans built the first eight-wheeled car with a four-wheeled truck at each

end and with twin seats arranged in rows with an aisle up the middle, thus abandoning the side-entrance idea—which is still to be found in England and other foreign countries—for a door at each end of the car. This was the initial step toward the vestibuled trains of today, as these end doors permitted the conductor of a train to go from one end to the other of it in the performance of his duties, besides allowing passengers to move about. Furthermore as these trucks were made so they would swing horizontally, the long cars could turn sharp curves without danger of getting off the track.

Winans also did pioneer and very important work in the development of locomotives. The first engine used upon the Baltimore & Ohio as well as the first one of the Charleston & Hamburg Railroad had a vertical boiler. This was merely the application of the upright stationary engine to the work required of a locomotive. The second engine, the West Point, constructed by the same builders as the first for the South Carolina line, was made with a horizontal boiler like the English locomotives, but the Maryland road continued to have built for several years and to use engines with vertical boilers, the first one having been satisfactory, and some of these engines continued in use by the company as late as the year 1893, when the last two that existed, which were employed for switching purposes at the Mount Clare yards in Baltimore, were taken out of service and sent to Chicago for exhibition in the World's Fair of that year. They are now stored away at Martinsburg, W. Va. These engines were commonly called "grasshopper locomotives" because their long driving rods, one on each side of the engine, moved vertically like the legs of a huge grasshopper. The York, the first of this series, had wheels only 2½ feet in diameter,

"Grasshopper" Locomotive, First Type Used on Baltimore & Ohio Railroad

weighed only three and a half tons—7000 pounds—and used anthracite coal for fuel, which was probably the first use of hard coal on a locomotive in regular service. Between Baltimore and Ellicott's Mills, 15 miles, it pulled four cars that weighed a total of fourteen tons—28,000 pounds—generally in one hour, but it was too light for regular use on ascending grades, and succeeding engines of the same pattern were made heavier. About a year after the York was received from the builders, springs were put on it and they proved successful in lessening the jarring of the track, which had been pronounced and damaging when the engine ran at full speed, and the next step forward was to also put springs on the freight, or burden cars as they were then commonly called.

Until July, 1834, there were only three locomotives on the road—the York, the Atlantic and the Franklin. Then four more engines were put in service—the Arabian, the Mercury, the Antelope and the American, the last two being built by Charles Reeder of Baltimore. In the autumn of the same year eight more locomotives were ordered. The board of directors refused to buy English locomotives, believing that they would not be satisfactory on the sharp curves here, and also because they would not burn anthracite coal, to the use of which the board attached great importance. The addition of these engines gave the road fifteen units as its total of motive power.

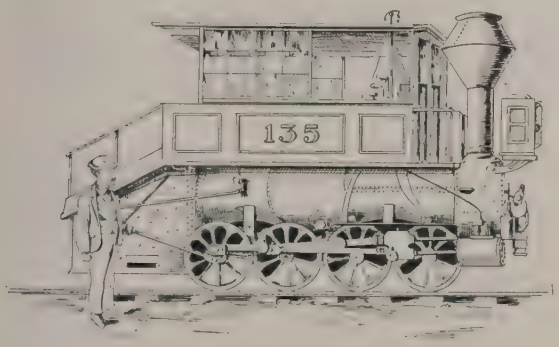
Concerning these locomotives it is very important to observe that the fourth annual report of the railroad company says that "the combined cylindrical and conical car wheels invented by the chief engineer of the company (Jonathan Knight) have been found of the utmost importance by the facilities they afford in turning curves." Also that "by the aid of this highly valuable improvement every doubt is removed of our being able to employ locomotive engines upon the Baltimore & Ohio Road."

There were several others also conspicuous for their inventions made during their connection with this line, some of them through their widespread activities becoming generally known for their achievements. Among them, besides Ross Winans, were John Elgar, Phineas Davis and Evan Thomas. Mr. Elgar, it may be mentioned, invented switches, turntables, chilled bearings, plate wheels and other improvements. During the construction of the first seventy miles of this line those who were concerned in the work solved most of the problems that first presented themselves in the building and operation of railroads; everything suggested in that connection was tested and then accepted or rejected according to its merits, and the American Railroad Journal of 1835 said of this Baltimore company: "Their reports have gone forth as a textbook and their road and workshops have been a lecture-room to thousands who are now practicing and improving upon their experience. This country owes to the enterprise, public spirit and perseverance of the citizens of Baltimore a debt of gratitude of no ordinary magnitude," etc. Not only did these reports serve as guides for railroad operation, but the charter of the road, which was drawn by John V. L. McMahon, has since been a model for railroad charters throughout the United States on account of its wise, comprehensive character.

After the death of Phineas Davis, which resulted from an accident September 27, 1835, George Gillingham, superintendent of machinery, and Ross Winans took the railroad shops at Mount Clare Station, Baltimore, and continued the building of locomotives and other machinery which was begun by Mr. Davis. This firm, Gillingham & Winans, was independent of the railroad company, but they had a contract with it to supply it with locomotives and other machinery at a stipulated price and to always give precedence to work for the company. They used the buildings and their mechanical equipment without paying rent, but kept them in repair, and in consideration of this loan of the shops they were able to build locomotives for the road at such a low figure as compared with other builders that the interest on the investment was considered to be fully paid.

The last two locomotives built by these partners in the autumn of 1836, when the weight of the engine was only eight tons, showed a tractive power much exceeding, it is stated, the greatest power that had up to that time been obtained on the Liverpool & Manchester Railroad in England with an engine that weighed twelve tons. This advantage was deemed especially gratifying by the directors because of the heavy mountain grades to be overcome in the operation of their road.

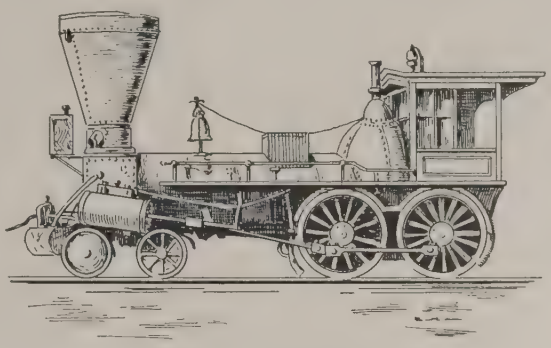
Ross Winans then began the building of locomotives on his own account. At that time his son, Thomas De K. Winans, was being educated, and five years later, on coming of age, he was admitted to partnership in the business. He was an engineer by profession, and he and his brother, William L. Winans, in later years went to Russia and planned and supervised the construction of the railroad from St. Petersburg to Moscow. Ross Winans, after starting business for himself, continued to employ his inventive faculties for the improvement of railroad equipment, and as the need for larger and more powerful engines became apparent their size was gradually increased until in 1844 he was building locomotives of twenty-two tons weight for pulling coal trains. These machines proved particularly valuable not only because of their increased power, but also for the reason that they burned Cumberland coal (bituminous) for fuel instead of wood, which was used on engines subsequent to the early use of anthracite coal. As the soft coal could be obtained on the line of the road, it was considerably cheaper than hard coal, which had to be brought from a distance, and it was also much more satisfactory than wood. A few years later the weight of these new engines, popularly called camel-backs, was increased to thirty-two tons, exclusive of the tender. Their chief characteristic was great steaming power, which was produced by the use of a firebox very large in comparison with the boiler. They were thus able to make steam fast, and they proved very valuable in surmounting grades. Some of these grades were so severe that there were originally four places between Baltimore and Frederick at which stationary engines were employed to help trains over the hills.



Winans' "Camel-Back" Locomotive

A feature of early railroad construction was the laying of a first stone, sometimes called cornerstone for lack of adequate nomenclature, at the time ground was first broken for a new line. Stone was probably chosen for this kind of memorial because the first track laid rested on a foundation composed of large stone blocks set in the ground at regular intervals, these stones supporting the crossties, which in turn supported the long stringers on which the flat-bar iron rails were fastened. The first stone of the Baltimore & Ohio Railroad, a block of sandstone, which is now preserved within an iron fence beside the old track near its point of beginning in Baltimore, bears on top the following inscription: "THIS STONE, Presented by the Stone Cutters of Baltimore In commemoration of the commencement of the BALTIMORE AND OHIO RAIL ROAD, was here placed On the 4th of July 1828, by the Grand Lodge of Maryland, Assisted by Charles Carroll of Carrollton, The last surviving signer Of the Declaration of American Independence, And under the direction of the President and Directors Of the Rail Road Company." On each of the two long sides of the stone is this: "First Stone of the Balt. & Ohio Rail Road."

The stone was lost sight of for many years. In revising grades it was covered to the depth of six feet and remained invisible until about twenty-five years ago, when its existence was recalled and its location having been established, it was unearthed and put in its present position above the spot where it was found, so that although the grade was changed its place with regard to the length of the railroad is unaltered. It is situated 450 feet west

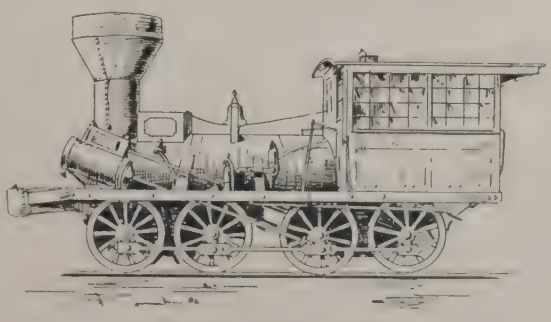


Wood-Burning Passenger Locomotive

of Catherine street on the old line from Mount Clare Station to Camden Junction.

The centennial anniversary of the railroad is to be observed appropriately in 1927, the date of the proposed celebration to be hereafter decided. Governor Albert C. Ritchie of Maryland has appointed a commission to represent the state on that occasion and to co-operate with various organizations, including the railroad company, to make the occasion appropriate and fitting. The commission is composed of George Weems Williams, John W. Garrett, Jacob Epstein, Alexander Brown and Van Lear Black, all of Baltimore; Holmes D. Baker of Frederick and Oliver H. Bruce, Jr., of Cumberland. Messrs. Brown and Garrett are of the same families as were the men of their names who were identified with the early history of the road.

The first stone—called corner stone—of the Baltimore & Susquehanna Rail Road, is preserved in the southern wall of the office building of the Northern Central Railway (now Pennsylvania Railroad), at the southeast corner of Calvert and Centre streets in Baltimore, where it is plainly visible. This stone bears the following inscription: "B.S.R.R. Augt. 8th. A.D. 1829." In the wall above it is a bronze plate with an inscription as follows: "The corner stone of the Baltimore & Susquehanna Railroad was laid by the Grand Lodge of Masons of the



Wood-Burning Freight Locomotive

State of Maryland on the eighth day of August 1829, at the request of the President and Board of Directors of the Baltimore & Susquehanna Railroad Company: It being the One Hundredth Anniversary of the Founding of the City of Baltimore. The stone was originally placed at a point on the Northern Boundary line of the City of Baltimore about thirty feet East of the centre line of the Baltimore & Susquehanna Railroad, a section of which had been graded in a Northerly direction for the distance of a quarter to a half mile. The stone was removed from its original position on Oct. 28, 1870 in consequence of the construction of the tunnel of the Baltimore & Potomac Railroad; was finally placed on the south wall of the General Office Building of the Northern Central Railway Co., Southeast corner of Calvert and Centre Streets, on the 4th day of December 1891; the Thirty Seventh Anniversary of the consolidation of the Baltimore & Susquehanna, the York & Cumberland, and the Susquehanna Railroads in one corportion, The Northern Central Railway Company."

Early statistics of railroads are scanty, but in the "American Library of Useful Knowledge," a thin volume compiled by Thomas C. Clarke and published in Philadelphia in 1841, is a list of railroads in the United States, either finished or under construction, which includes lines in the South as follows: Philadelphia & Baltimore, Baltimore & Susquehanna, Newcastle & Frenchtown, Baltimore & Ohio, Baltimore & Washington (the latter is part of the Baltimore & Ohio), Winchester & Harpers Ferry, Richmond & Potomac, Richmond & Petersburg, Petersburg & Blakely, Portsmouth & Weldon, Hickford & Gaston, Raleigh & Gaston, Wilmington & Halifax, Charleston & Hamburg, Savannah & Macon, Macon & Forsyth, Augusta & Decatur, Tuscumbia & Decatur, Montgomery & West Point, Vicksburg & Jackson, Jackson & Brandon, Grand Gulf; New Orleans & Nashville, Clinton & Port Hudson, St. Francisville & Woodville, Memphis & Lagrange, and Louisville & Lexington. Total 27. It is also on record elsewhere that a railroad was built in 1831 from Manchester, Va., 13 miles along the James River to coal mines, and that in the same year a railroad 4½ miles long was built from New Orleans to Lake Pontchartrain.

By 1883 there had been built 265 distinct lines of railroad in the South, not including Arkansas and Texas, and distributed by states thus: Maryland 27, West Virginia 14, Virginia 36, Kentucky 22, North Carolina 28, South Carolina 19, Tennessee 24, Georgia 32, Florida 17, Alabama 22, Mississippi 10, Louisiana 14.

"In 1879 and 1880," says the "International Cyclopedia," an old publication, "important combinations and consolidations of Southern railroads were effected and new roads projected and constructed, the whole tendency being toward the establishment of independent trunk lines from the northwest to the South Atlantic seaboard, with a view to lessen the vast preponderance of railroad vitality and influence in the North over the South. The Nashville & Chattanooga, Louisville & Nashville, Central of Georgia, Cincinnati Southern and other roads thus assumed a marked prominence—not alone in the stock market, but also as newly effective links in the great chain of railroad transportation in the United States. The Cincinnati Southern Railway is perhaps the only existing instance of a city building a railway for its own purposes. The city of Cincinnati, built this line under the direction of a board of trustees created by an act of the legislature of Ohio, May 4, 1869, construction being begun December, 1873. The road is 336 miles in length from Cincinnati to Chattanooga and has steel rails."

In the year 1830 there were 23 miles of railroad in operation in the United States, this being principally on the Baltimore & Ohio Railroad, although the Charleston & Hamburg line by that time had a few miles of track. In 1840 there were 2818 miles of operated line in this country, and in 1850 the total of operated line was 9021 miles. During the next ten years there was great activity in railroad construction, and in 1860 the total mileage in the country was 30,635 miles, of which about 7500 miles, or twenty-five per cent of the aggregate, were in the South. In 1870 the mileage of the country was 52,914 miles, with about 13,000 miles in the South. In 1880 the South had 24,866 miles of line, which was more than 25 per cent of the total mileage in the United States, which was then 93,349 miles. Then followed a very active period of railroad construction in the South, and in 1890 this section had 30 per cent of the railroad line in operation, the total for the South being then 50,250 miles and for the entire country 166,703 miles. Ten years later, in 1900, the South, with 61,701 miles, had 31½ per cent of the total mileage of the United States, the aggregate being then 193,346 miles. In 1910 there was another gain in percentage by the South, with 85,739 miles, or very nearly 35½ per cent of the total of 240,439 miles for the United States. In 1920 the figure was raised to 36 per cent, with 90,887 miles in the South as compared with 252,845 miles in the whole country, these figures being based on the last census.

A review of early railroad operation in the South shows that the Baltimore & Ohio Railroad, which, as stated at the outset of this article was the first railroad common carrier in America, was opened May 24, 1830, from Baltimore to Ellicott's Mills, Md., 15 miles. December 1, 1831, it was in operation from Ellicott's Mills to Frederick, Md., 46½ miles farther, and to Point of Rocks, 8 miles beyond Frederick, April 1, 1832. The Washington Branch (now part of the main line via the National Capital) was opened August 25, 1834, from Relay to Washington, 31 miles. From Point of Rocks to Harper's Ferry, Va. (now West Virginia), it was opened December 1, 1834, but nearly eight years more elapsed before the line was opened to Cumberland, Md., 94 miles further. Then ten years passed before the line was completed to Wheeling on the Ohio River at the end of the year 1852, being opened to that point January 1, 1853. May 1, 1857, the Parkersburg Branch, 104 miles long from Grafton to Parkersburg, W. Va., on the Ohio River, was opened, thus beginning the line to Cincinnati, which was completed over the Marietta & Cincinnati Railroad.

In the instance of the Charleston & Hamburg Railroad —afterwards South Carolina Railroad—there does not seem to have been kept any historical data to show the different stages of work on the line, which was finished from Charleston to Hamburg, October 1, 1833. Perhaps the rapidity with which construction was pushed was responsible for the failure to preserve data about the work, but enough track had been completed out of Charleston by January 15, 1831, just one year after ground was broken, to permit of an excursion trip with passengers on that day. The locomotive Best Friend was used, and it is probable that regular trains were run over part of the line immediately. On March 5 of the same year the second locomotive, the West Point, was demonstrated with a train having a barrier car between the first car of a four-car train and the locomotive. This barrier car was a flat car loaded with six bales of cotton securely fastened thereon for the purpose of protecting passengers in the event of an accident to the engine. There were 117 passengers, fifty of whom were ladies, and a trip of 2¾ miles was made in eleven minutes. Another run of 2¼ miles was made in eight minutes. This engine was put in

regular use July 15 of that year, but the month before the Best Friend had exploded, owing to the fact that the safety valve had been tampered with, and later in the year some parts of that engine were used in constructing the Phoenix, which was built by the company in Charleston. Several other locomotives, each of which had eight wheels, and which were probably the first eight-wheeled locomotives used anywhere, were bought by the company in 1832 and 1833, their names being South Carolina, Charleston, Barnwell and Edisto. The Hamburg, a four-wheeled engine, was also obtained late in 1833. A new-type engine with six wheels was designed by Horatio Allen of Charleston in 1835, and three of them, named Cincinnati, Kentucky and Allen, were built in England and equipped with pilots, commonly called cow-catchers. The line was completed to Hamburg, S. C., 136 miles October 1, 1833, and the Columbia branch of 68 miles was opened November 1, 1840. The Camden branch of 38 miles was opened June 26, 1848. The latter was built under a separate charter, but all three roads were merged under the charter of the South Carolina Railroad, which had been obtained in 1844.

Other early railroads in the South are the Richmond & Petersburg, chartered February 25, 1834, and opened for its entire length of 22½ miles February 13, 1835; Seaboard & Roanoke, chartered as Portsmouth & Roanoke in Virginia, and as Roanoke in North Carolina, March 8, 1832, and opened from Portsmouth, Va., to Weldon, N. C., 80 miles, in 1835; Richmond, Fredericksburg & Potomac, chartered February 25, 1834, and opened from Richmond to Fredericksburg, Va., 62 miles, January 23, 1837; Annapolis & Elk Ridge, chartered March 21, 1837, and opened December 26, 1840, from Annapolis to Annapolis Junction, Md., 20½ miles; Wilmington & Raleigh, chartered January, 1833, and opened from Wilmington to Weldon, N. C., 162 miles, March 9, 1840; Georgia Railroad (owner the Georgia Railroad & Banking Co.), chartered December 21, 1833, and completed Augusta to Atlanta, Ga., 171 miles— with branches to Macon, 74 miles; to Athens, 40 miles, and to Washington, Ga., 17¾ miles—in 1845; Rome Railroad, chartered in 1837 and opened from Kingston to Rome, Ga., 20 miles, in December, 1848; Raleigh & Gaston, chartered January 29, 1839, and completed from Raleigh to Gaston in 1844 and to Weldon, N. C., a total of 79 miles, in 1852; Montgomery & West Point, chartered in 1834 and opened in 1854 from Montgomery, Ala., to West Point, Ga., 88 miles. Most of these roads are now in trunk-line systems.

A prominent instance of a railroad being constructed by a state government is that of the Western & Atlantic Railway, that connects Atlanta and Chattanooga and which was built by the state of Georgia. Its 138-mile line was finished and opened in 1850. It is now leased by the state to the Nashville, Chattanooga & St. Louis Railway Co., which has operated it for many years.

The origin of the great trunk lines in the South is interesting. The Atlantic Coast Line, for instance, had its beginnings in the Wilmington & Raleigh Railroad, afterwards Wilmington & Weldon; the Seaboard Air Line in the Portsmouth & Roanoke; the Southern Railway in the Orange & Alexandria (chartered in 1848 and opened partly in 1854), and which in later years became Virginia Midland; the Chesapeake & Ohio in the Virginia Central and Covington & Ohio railroads; the Norfolk & Western in the New River and the East River railroads; the Louisville & Nashville in itself, being chartered in 1850 and completed from Louisville, Ky., to Nashville, Tenn., 185 miles, in 1859; and the Mobile & Ohio in itself, being chartered in 1848 and given a land grant by Congress in 1850, the first grant of lands by that body to any railroad —and it is now in the Southern Railway Company's system.

The Illinois Central Railroad, whose line runs from Chicago to New Orleans, was chartered in Illinois in 1851 under its present name; the Southern Pacific system, which includes the Texas and Louisiana railroads, originally known as Galveston, Harrisburg & San Antonio, Texas & New Orleans, Louisiana Western, Morgan's Louisiana & Texas Railroad, etc., owed its origin to the consolidation in 1870 of several railroads in the Southern part of California, and the line was gradually pushed eastward; the Missouri, Kansas & Texas Railway system also began with a consolidation of several small lines, its start being in Missouri and its main line running from St. Louis to Dallas; the Missouri Pacific system originated with the Pacific Railroad Co., chartered in 1849 to build from St. Louis to the western boundary of Missouri, and was completed to Kansas City in 1865. It may be of interest to note that the first railroad stake driven in Kansas City, which was for the building of this line, was set by George C. Wilkins, a civil engineer, who was for many years later general agent of the Pennsylvania Railroad at Baltimore.

The Chicago, Rock Island & Pacific system, whose lines penetrate Missouri, Tennessee, Arkansas, Texas, etc., was begun with the chartering of the Chicago & Rock Island Railroad in 1851. The St. Louis-San Francisco system, which runs from St. Louis to Birmingham and other points in the South, had as its nucleus the Atlantic & Pacific Railroad chartered in 1866, and which started with the southwest branch of the Pacific Railroad of Missouri. The Santa Fe System began as the Atchison & Topeka Railroad, chartered in 1859, the name being changed to its present form, Atchison, Topeka & Santa Fe, in 1863. The Texas & Pacific system was chartered by Congress in 1871 and began its career by consolidating several small lines in Texas & Louisiana, having also incorporated under the general railroad laws of Texas. The St. Louis Southwestern Railway was formerly the St. Louis, Arkansas & Texas Railway, the beginnings of which were in Texas in 1879.

The following table shows the main-line trackage of railroads in the South by states for 1880, 1900 and 1920, covering a period of forty years, during the great growth of railroads in this section:

States	1880	1900	1920
Alabama	1,843	4,226	5,377
Arkansas	859	3,360	5,052
District of Columbia	18	32	36
Florida	518	3,299	5,212
Georgia	2,459	5,652	7,326
Kentucky	1,530	3,060	3,929
Louisiana	652	2,824	5,223
Maryland	1,022	1,376	1,436
Mississippi	1,127	2,920	4,369
Missouri	3,965	6,875	8,117
North Carolina	1,486	3,831	5,522
Oklahoma	289	2,399	6,572
South Carolina	1,427	2,817	3,814
Tennessee	1,843	3,137	4,078
Texas	3,244	9,886	16,125
Virginia	1,893	3,779	4,703
West Virginia	691	2,228	3,996
Total in the South	24,866	61,701	90,887
Total in the United States	93,267	193,346	252,845

As the South led the country in early railroad building, so it is now constructing two conspicuously prominent new lines, as well as a large amount of double tracking.

Fifty Years of Progress in Highway Improvement in Southern States

By Thos. H. MacDonald, Chief of Bureau of Public Roads, United States Department of Agriculture

A witness in a drainage case, asked if he had measured the depth of water in a ditch, answered, "I measured the water with a stick, but had nothing with which to measure the stick."

To determine highway progress in a large group of states in an adequate manner requires some unit or units of measurement that do themselves satisfy the understanding or assist the imagination to fill in the real picture. Mere figures or statistics possess only meager information value. Neither years, miles of road built nor funds expended tell the real story. Something more is needed.

Thos. H. MacDonald

Progress made against the most difficult opposition may not be measured only in terms statistical. Physical undertakings do require a certain amount of time, but small in comparison to the time and effort required to overcome the active opposition of ignorance and selfishness or the passive opposition of public inertia. So in highway progress the most reliable measure of progress is the principles which have been written into the laws and which must be relied upon to produce results. If these principles are right the results are certain. If they are not, no apparent results are a reliable measure of progress.

The fifty-year period just ending does not coincide with any one particular phase of highway development in the Southern states. It covers several phases, to understand which it is necessary to go back much further. Today highway progress has come when any state has written the following principles into its laws:

1. The division or classification of all public roads into groups or systems of like importance and the selection of a limited system of the main state highways under jurisdiction of the state.
2. The establishment of an adequate non-partisan state highway department.
3. The providing of state funds for construction and maintenance of the state system under the state highway department.

Other principles are desirable; the above are essential.

Highway progress can, then, be measured in these states by their laws, and by the organizations established under these laws. In these lie the truest story of progress through human effort.

Water transportation very naturally made its impress first upon the development of the Southern states. The tidewater country was settled and brought to high cultivation. Country estates were built overlooking the water that have given us the finest standards of architecture and sound construction. The seaports became thriving cities. Meantime the interior of these same states were almost unexplored, uninhabited areas. Then the Federal Government and the states began to build roads or to grant franchises to toll companies. The National Pike, built under the laws of Maryland from Baltimore to Cumberland and by direct appropriation from the Federal Treasury and under direct supervision of the Army engineers, westward to the Illinois line, is the classic example of

MODERN HIGHWAYS ARE MAKING ACCESSIBLE MOUNTAIN SECTIONS OF THE SOUTH

early highway building. This road carried an immense traffic and was a major factor in the settlement of the Ohio Valley. There were many other important highways. The state of Kentucky early began the building of state highways. Toll roads built by corporations developed largely in Virginia, Maryland, Tennessee and Kentucky. An important toll road was built from the Shenandoah Valley of Virginia via Cumberland into the central part of Kentucky. The first great road achievement in Arkansas, then a territory, was the completion by the Federal Government of a road from Memphis across the swamps of the Mississippi and on to Little Rock in 1828. This road was continued west to Fort Smith. Another road was built from the Missouri line to Little Rock to the southwest corner of the territory. These roads, extending at approximately right angles from Little Rock to the four borders of the territory, opened lines of travel that exerted the most profound influence on the development of that section of the South.

1. Virginia Toll Road of 10 Years Ago. 2. Old Toll House on National Pike. 3. Modern Traffic Now Passes Over This Old Bridge on the National Pike.

It will be noted that the state and Federal governments, by direct appropriations or by granting franchises to toll companies, provided the early roads. Some were built as military roads to reach and connect the forts on the frontiers. But more grew out of the restless spirit of the pioneers, who continually pushed westward to the new, rich lands of the Ohio and Mississippi valleys and beyond these to the great plains of the South and Southwest. A conception of what constituted a road exhausted the range of possibilities. Some were only cleared trackways through the forests, but many of the toll-road corporations employed engineers who developed high engineering standards for location and construction. On the national road the maximum gradient was 9 per cent. It had a macadam surface, and the streams were bridged with most excellent stone arches. Highway building reached relatively high standards of development before, say, 1850.

The period 1790 to 1853, when the stage coaches ceased running on the old National Pike, marks the period of principal highway development under state and Federal jurisdiction. Only small beginnings had been made by the counties or communities. In the main, following the English idea, each man was expected to labor annually for several days upon the roads. In Maryland there is a record of cash taxes as early as 1764, and in this state there are many general acts providing for levying taxes for the purposes of road and bridge building. A law was

1. The Best Roads in Olden Days Were the Turnpikes

2. Early Type of Road Construction in the South

BEFORE AND AFTER IN MODERN ROAD CONSTRUCTION IN THE SOUTH

provided for Baltimore county, Maryland, in 1766 providing for a tax of ten pounds of tobacco per poll. This is apparently the first record of authority of the counties to levy a tax on property in lieu of the voluntary labor tax in the Southern states. But, generally speaking, the counties relied upon compulsory labor for road making for more than one hundred years from this first cash tax.

The state of Louisiana in 1870 permitted the police juries to levy a tax. Perhaps one of the outstanding early county laws providing revenues for road improvement was the Mecklenburg county road law passed by the Legislature of North Carolina in 1879. This law, after some vicissitudes, was finally re-enacted in 1885, and has been referred to by competent authorities as the beginning of modern road legislation in the state of North Carolina.

With the development of the railroads, highways ceased to be objects for the consideration of the Federal and state governments, whose attention was diverted to the building of new transportation, and the highways which had been so laboriously developed were turned back to the jurisdiction of the counties. The toll roads, or pikes, ceased to be profitable and were abandoned by the corporations. Chas. H. Moorefield, chief engineer of the South Carolina Highway Department, gives a splendid picture of the transfer of interest from highways to railroads as follows:

"Prior to the railroad era, which began in South Carolina in the 30's, there were connected roads over which

A SECTION OF THE STATE ROAD SYSTEM IN MARYLAND

View of the Old National Pike Modernized, Showing the Western Maryland Railroad, the Chesapeake and Ohio Canal and the Potomac River

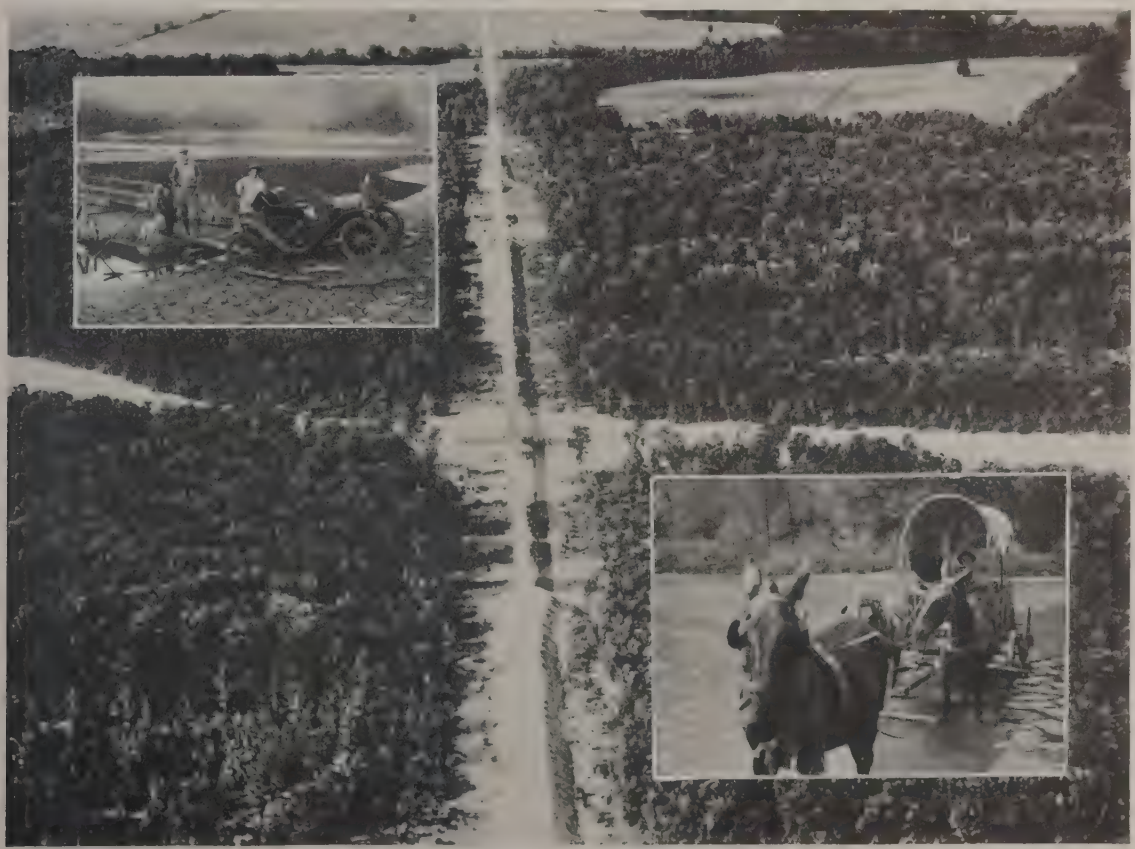
A Brick Road in Florida

horse-drawn vehicles passed entirely across the state, the principal streams being crossed by ferries. A few of these roads and ferries received some support from the state government, but they were for the most part under county supervision. Many of the most difficult ferries were abandoned during and immediately after the Civil War and, due to the development of railways, have never been put back in operation.

"Beginning about 1890, the railroads in this part of the country began consolidation which, in about fifteen years, resulted in a well-connected railway system, serving almost every center of population in the state. Along with this development in railway operation, interest in public roads became extremely narrow, so that between 1900 and 1910 much of the public road work was done by township units rather than counties. The interest at this time was almost altogether in local market roads."

In other words, in the century from 1775 to 1875, the highways under Federal and state administration had ascended to a high peak of development measured by the needs of that time, from which they had rapidly gone back to objects of local concern only, and for the maintenance or extension of which in a majority of the states only the compulsory labor taxes were available.

From about 1860 to 1910 may well be termed the dark ages in highway development for this whole group of states. Here was a fifty-year period during which the roads were of local interest only. Every advance was made slowly and painfully, and by a tremendous expenditure of human effort. The Constitutional amendment of 1899 in Arkansas provided a road levy of not exceeding 3 mills if a majority of the qualified voters in the county had voted the tax at the preceding general election. Not until 1906 did Mississippi have a county cash tax. County bonds apparently were not provided for to any considerable extent until after 1890. In 1899 the county commissioners in Florida were authorized to issue bonds for building hard-surfaced roads, and the same year some counties in North Carolina were given authority to take a vote on the issuance of bonds. Maryland and Virginia, prior to 1910, provided some state aid to assist the counties, but it is apparent that the development for the fifty years prior to 1910 for this group of states as a whole was



THE OLD AND THE NEW

The Federal-Aid Bridge Over the Santee River in South Carolina From an Official Photograph by United States Army Air Service. Inserts—River-Crossing Methods Which Retarded the Development in Many Parts of the South

1. Three Yoke of Oxen Required to Pull 800 Pounds on This Mississippi Road in 1912. 2. Highway Traffic of a Decade Ago. 3. Transportation in 1909, Near Andrew Jackson's Tailor Shop in Tennessee. 4. and 5. Difficult Traveling. 6. Stage Coach on Old National Pike. 7. Old Wooden Bridges Are Being Replaced by Modern Structures. 8. Main Roads of this Sort Are Passing in the South

dependent upon local effort and local resources. Naturally some of the richer and more progressive counties made a most creditable showing. But these instances were relatively few, and no adequate highway development was under way and no plans by which adequate highways could be secured had been formulated. Generally speaking, the rural roads were in a deplorable state of repair. The long Reconstruction period following the war, lack of material resources, the lack of adequate legislation and the general hostility to expenditures resulted in a deplorable condition of the rural highways except in isolated instances. There was no thought of continuity between communities or of highways performing a state-wide function. The report of the Maryland Geological Survey of 1899 says of the National Road:

> "Though its glories have long since departed, and coach and wagon no more throng its way, the National Road, rich in its association of historic interest, still constitutes one of the most enduring monuments of Maryland's past, while the idea to which it owes its existence—the welding of the West and the East in commercial and national unity—has found other and more lasting expression."

Perhaps the chief characteristic of the period 1899 to 1910 was the granting of authority to the counties or road districts to issue bonds. All of the Southern states seem to have provided such general authority except Maryland and South Carolina, where issuance of road bonds by counties has always been a matter for special legislation. As early as 1904 the state of Maryland provided a small fund for state aid, but there was very little development of this principle prior to 1910.

Type of Overhead Crossing

It is apparent that for the Southern states as a whole the fourteen years since 1910 is the period during which the big progress was made. As soon as the automobile made itself felt, the reflex was manifested in the issuance of county bonds for the building of county highway systems. For example, prior to 1910 there had been no bond issues in any county of West Virginia, but from 1910 to 1917 the more progressive counties had issued a total of more than $12,000,000 in bonds for highway purposes. In Mississippi, where almost no rural roads had received any adequate improvement, a start was made, and just prior to the war the annual construction had reached a rather large volume in the relatively richer counties.

MODERN GRAVEL ROAD NEAR ASHEVILLE

Insert—A Western North Carolina Mountain Road of 12 or 15 Years Ago

Primitive Method of Crushing Stone on Toll Road in Kentucky in 1909

Under the county plan the relatively richer counties were able to go ahead to meet their own local needs, but the poorer counties made little progress.

The next step was the creation of state highway departments and the establishment of funds for state aid. The state of Maryland has continually led in the adoption of new principles of legislation. A state-aid fund was established in 1904, and the State Geological and Economic Survey, having certain duties with reference to the roads, was established in 1896. A State Roads Commission was established in 1908. North Carolina followed with an ex-officio highway commission in 1901, Virginia in 1906, Tennessee in 1907, West Virginia in 1909, Louisiana in 1910, Kentucky in 1912; until, with the creation of the Texas Highway Commission in 1917, all of the states were provided with a central state authority. A number of these often had advisory powers only. The form of these departments and the duties have been changed from time to time until all of the states have established highway departments, with organization and authority competent to administer the provisions of the Federal Highway Act, this being one of the basic requirements of the act in 1916. The principal difference which exists between the states now lies in the amount of funds and the sources of these funds which have been placed at the disposal of the highway departments. The states of Alabama, Maryland, Missouri, North Carolina and West Virginia have provided their state highway departments through state bond issues, with funds, under jurisdiction of the department, greatly in excess of the Federal-aid allotments, so that these states are carrying on not only the Federal-aid projects, but are doing a large amount of work additional without other assistance.

While state funds have been provided in the other states, Arkansas, Georgia, Louisiana, Mississippi, Oklahoma, South Carolina, Texas and Virginia are using in addition to state funds help from the counties and improvement districts. The relatively large sums which have been

INSPECTION OF MODERN HIGH TYPE OF ROADWAY CONSTRUCTION IN NORTH CAROLINA BY THE LATIN-AMERICAN HIGHWAYS DELEGATES LAST SUMMER

expended in Arkansas, Georgia, Mississippi, Louisiana, South Carolina and Texas have been possible only through the contribution from these local sources.

Perhaps the outstanding example of providing funds for road construction occurred in North Carolina, when, in 1921, during the very depth of the economic depression, the people of the state showed their faith by voting $50,000,000 to be expended for road improvement. They followed this by an additional issue of $15,000,000. The effect of this big program of road construction upon the state has been remarkable. It became evident after state funds for road construction were made available that adequate provision for maintenance of these roads was all important. Maryland in 1906 and 1908, and Louisiana in 1910, had provided for state maintenance, Tennessee in 1915, and the other states followed with the last acts in 1924. Provision for state maintenance in most of the states has only been made in the past three or four years, and it is this feature perhaps more than any other that has developed the sentiment and has placed road improvement on such a popular basis throughout the South. In the areas which have been cultivated for a long period the constant tilling of the soil in which there was considerable mineral matter, together with the rains and the wind, have left on the higher land a topsoil which makes a cheap surfacing material which may be maintained under the lighter traffic. Sand-clay mixtures have also been

Modern Steel and Concrete Bridge on Alexandria-Melville Road, Louisiana

The Pea River Bridge. A State-Federal Project in Alabama

NEWLY COMPLETED YADKIN RIVER BRIDGE NEAR SPENCER, N. C. LENGTH 1300 FEET

widely used. The absence of frost of any considerable moment, which is so detrimental to the natural-soil roads of the North, has made it possible, by the modern maintenance methods, to hold in serviceable condition thousands of miles of roads after they have been graded and drained, and this has been the outstanding development up to the present time in the Southern states.

The building of the higher type roads is progressing, as it must progress, more slowly, but particularly in Maryland, North Carolina, West Virginia and Louisiana, splendid progress has been made on the roads of this type. Maryland was the first state to establish a main road system in 1908, Missouri in 1913, Kentucky in 1914, North Carolina in 1915, until all of the states have now established a definite state highway system. A number of these laws have been subsequent to the Federal Aid Act of 1916.

It is apparent that the Federal legislation, requiring, as it did, centralized state authority, very greatly helped the Southern states to mature their laws providing for the essentials which have been referred to in the opening paragraphs of this paper. In a number of the states there is yet too much reliance placed upon financial help from the counties, and the road laws for this group will not become perfected until each state has state funds provided to build and maintain a state system under jurisdiction of the state highway department without aid, financial or otherwise, from the counties.

Through all these years the struggle to obtain legislation that would provide for highway improvement has been going on steadily, and it is evident that state after state has brought its highway laws toward perfection. The administrative organizations likewise have been improved and built up, until they are in a position to handle the road work on an efficient basis. It is possible to obtain an idea of the physical changes by the following table showing the comparison between the road mileages in 1904 and 1921 and the improved road mileage for the same dates:

TOTAL ROAD AND IMPROVED HIGHWAY MILEAGE

States	Total road mileage 1904	Total road mileage 1921	Improved surfaced road mileage 1904	Improved surfaced road mileage 1921
Alabama	50,089	58,410	1,720	10,420
Arkansas	36,445	74,866	236	3,871
Florida	17,374	27,643	886	6,438
Georgia	57,203	94,912	1,634	18,339
Kentucky	57,137	68,704	9,486	15,436
Louisiana	24,897	39,803	34	2,771
Maryland	16,773	14,772	1,570	3,663
Mississippi	38,698	53,085	149	5,744
Missouri	108,133	111,520	2,733	7,879
North Carolina	49,763	68,204	1,259	16,755
Oklahoma	43,554	134,263	....	2,461
South Carolina	41,830	61,850	1,878	6,908
Tennessee	48,989	62,546	4,285	9,878
Texas	121,409	167,685	2,128	14,883
Virginia	51,812	59,080	1,600	7,260
West Virginia	26,178	35,173	254	1,367
Total	790,284	1,132,516	29,852	134,073

During this 17-year period the public road mileage increased by 40 per cent. During the same period the improved road mileage increased by 350 per cent. In 1904 only 4 per cent of the total road mileage was reported as improved, and in 1921, notwithstanding a 40 per cent increase in the total road mileage, the report shows 12 per cent of the total road mileage improved, and a considerable increase has been made in the improved mileage since that date.

The Federal Highway Act of 1921 provided that each state should lay out a system of roads not exceeding 7 per cent of the total public road mileage on which the Federal-aid funds are to be expended. These roads comprise the main interstate and intercounty roads.

For the past three years a detailed study has been made of the whole highway situation in these states by the state highway departments co-operating with the Federal Bureau of Roads.

In selecting the Federal-aid system the most careful attention has been given to the planning of the interstate routes that will connect all sections of the South with each other, and to the through routes which will carry the highway traffic to the North, East and West. Today this system, as planned, contemplates the improvement of through routes, serving not only the individual states themselves, but the national traffic. They are opening up and helping to develop the mountain region for both summer and winter resort purposes, and making yearly more accessible the Gulf Coast country. In other words, they are helping the South to capitalize in a very tangible way its recreational and resort possibilities, which are tremendous. Annually the influx of travelers from the outside is growing. One section of the Shenandoah Valley reported this fall a foreign car per minute going South during a period in October. But for the people of the South they are bringing even greater advantages. The whole Appalachian system up to the beginning of road improvement under the state highway departments was practically an isolated region, both to those without and within. The roads in and through the mountains are opening up to the people of the Coastal Plain the cooler recreational areas, with relief from the summer heat, and are bringing to the mountain people the advantages of intercommunication, community life and of an income from the outside. What has been so long needed by these mountain people, of the purest Anglo-Saxon blood, is the opportunity to communicate with each other, to build a community life, community interests, in place of the isolated family life which has been forced upon them by lack of communication.

The Federal-aid highway system as now laid out, and the progress made in its improvement during the fiscal year 1924, is shown in the following table:

STATEMENT OF FEDERAL HIGHWAY MILEAGES
October 22, 1924

States	Mileages completed during fiscal year 1924	Mileages of seven per cent system approved to date
Alabama	281.6	3,872.00
Arkansas	120.7	4,624.00
Florida	54.1	1,883.00
Georgia	313.4	5,450.00
Kentucky	149.8	3,254.50
Louisiana	51.2	2,681.00
Maryland	60.6	*1,441.74
Mississippi	144.3	3,357.00
Missouri	357.0	7,530.00
North Carolina	110.2	3,790.30
Oklahoma	123.8	5,589.50
South Carolina	320.6	3,047.00
Tennessee	85.2	3,122.20
Texas	641.2	10,947.00
Virginia	163.9	3,068.20
West Virginia	52.0	1,918.50
Total	3,029.6	65,575.94

* In excess of 7 per cent of total mileage.

The progress since the beginning of Federal aid is shown in the table on the opposite page:

STATEMENT OF FEDERAL-AID HIGHWAY WORK SEPTEMBER 30, 1924

States	Work completed		Under construction	
	Miles	Total cost	Miles	Total estimated Cost
Alabama	731.6	$8,382,784	654.2	$12,321,253
Arkansas	991.8	12,378,233	351.7	6,763,086
Florida	194.4	4,937,458	115.9	5,690,738
Georgia	1,385.9	19,175,261	631.5	8,355,008
Kentucky	497.3	12,652,853	293.6	7,684,056
Louisiana	778.7	9,875,076	272.4	4,605,968
Maryland	266.8	7,423,354	60.6	1,949,792
Mississippi	699.5	8,557,661	466.8	7,923,724
Missouri	967.4	14,134,452	651.5	16,083,683
North Carolina	1,015.3	17,202,554	198.3	6,806,946
Oklahoma	596.8	15,041,717	317.7	7,366,808
South Carolina	1,131.1	10,563,111	358.6	5,061,070
Tennessee	351.1	9,378,626	396.4	12,755,153
Texas	3,445.0	47,065,736	1,425.8	22,989,552
Virginia	630.3	11,529,258	264.8	8,060,553
West Virginia	287.6	6,485,318	148.3	4,330,768
Total	13,970.7	$214,783,452	6,608.1	$138,748,158

What is true of the mountain regions is also true of the Coastal Plain. Development roads are helping to open a region which can be made highly productive for many kinds of crops. Perhaps some little glimpses of individual states may give an adequate idea of progress. Herbert Wilson, chairman of the State Highway Commission of Arkansas, says:

"Under our new road law development is proceeding, efforts are being made to connect up improvements previously made, and I think that within two or three years' time Arkansas can boast of a very excellent system of state highways well connected so as to give service to the traveling public the year round. By that time I am sure that we will have three or four different routes entirely through the state completely surfaced."

Major C. P. Fortney, chairman of the West Virginia State Road Commission, says:

1. Concrete Road in Arkansas Where the Mississippi Swamp Formerly Defied Traffic Between Memphis and Little Rock. 2. Modern Bridge in Mountains of North Georgia. 3. Type of Sand Asphalt Road. 4. Swamp Road Construction on the Old Spanish Trail in Louisiana. 5. This Is the Isolation, Highways Are Ending in the Mountains—Thirteen People Live Here and a Few Years Ago the Children Could Not Reach a School

"With this $30,000,000 (from the 1920 bond issue of $50,000,000) and $2,033,000 of Federal aid received from 1921 to 1924, the State Road Commission built or placed under construction 1223 miles of road, 91 large bridges, 250 small bridges, and has reconstructed a considerable mileage of roads taken over from counties as parts of the state road system. The various counties have continued to expend money on roads. Some of this has been spent on state routes to hasten their completion within the borders of the counties making the expenditure, and some on roads connecting with state routes. Funds raised by bond issues for road purposes by the counties since 1917 have totaled $22,231,700, or almost double the sum raised in the preceding 54 years. Almost all of the larger cities and towns of West Virginia are now connected by hard roads. The network of highways is being rapidly extended in every county."

One of Florida's Many Beauty Spots, Dixie Highway South of Daytona

B. H. Piepmeier, chief engineer of the Missouri Highway Commission, says:

"We have one place where the improvement of a road has attracted a large corporation, and it has emponded one of our main streams, making a large lake for pleasure purposes and using the overflow for power development. Improved roads have developed isolated communities in that the improved road permitted heavy trucking, which served the community about as well as a railroad."

As has been noted throughout, Maryland has taken a leading position in the development of its highways, and the state has had an improved system long enough to have adjusted itself to the new means of transportation. J. N. Mackall, chairman of the State Roads Commission, says:

"The soil of southern Maryland and of the Eastern Shore was particularly adapted to the growing of market-garden produce, so that it only needed a means of quick transportation to convert the land from a corn and wheat crop to the market-garden crop. By transporting this market-garden produce to the railroads for shipment in refrigerated cars, it made the crop easily marketable, and because of the choice of markets at the highest prices. Farm land throughout this area was sold for an average of $30 an acre twenty years ago. Much of the land was not cultivated, so that its productivity was very limited. The land which sold at $30 an acre twenty years ago will bring on an average of $100 per acre today. Much of the land peculiarly suited for market-garden produce sells for much higher than this, but the average price of farm land for the entire area has been increased from $30 to $100 per acre.

"Practically all of the intensive gardening is along the line of the improved roads, and it is quite evident that as the roads are further extended into the rural sections, there will be further land conversions which will add enormously to the value of the state. The taxable basis of the state outside of Baltimore city was $320,849,699 in 1908 and $765,477,588 in 1923. All of the increase in value, perhaps, cannot be attributed to the improved roads. That nearly all of it can, however, is not susceptible to proof, but it is not disputed by any well informed person."

H. C. Dietzer, State Highway Engineer of Mississippi, says:

"Relative to the benefits derived by isolated communities, we give you as a typical example the road situation in Leake county, in which are located Federal-aid projects 102, 103, 104 and 105. At the time this road work was started this county was not served by a single railroad. Since the construction of these roads this county has made rapid progress in development. Many more schools have been built, and the commerce of the county has been such that while at the time the roads were constructed the sand-clay type gave satisfactory service, at least one of these roads at this time is unsatisfactory and will be so until we can surface it with gravel. This development is only typical, as in all cases the advent of good roads has caused great steps forward to be taken in the construction of schools, the small schools which were formerly in existence being consolidated, and the students transported with motor-trucks over improved roads for great distances, which formerly was impossible."

In South Carolina for the years 1919 to 1923, inclusive, there has been expended upon the state highway system for roads $17,471,000, for bridges $2,863,000, for maintenance and betterment $1,696,000. In 1923 the registered motor vehicles increased by 34 per cent over the year previous, and for this year the increase has amounted to 21 per cent. Chas. H. Moorefield, State Highway Engineer of South Carolina, says:

"On the whole, my comment is that highway development is generally following the economic needs in South Carolina, but with a decided lag. When it is considered that from the time of King Tut down to about 1830 no change had occurred in transportation methods, and from 1830 to the present time, less than one hundred years, three decided changes in the methods of transportation have taken place, it does not seem strange that there should be a lag between the needs of traffic and provisions to meet these needs."

In Louisiana one of the splendid advances that has been made under the present State Highway Department is the building of important sections on interstate and state roads over the marshes which from the time the country was discovered until now have remained impassable except during the dryest weather. The swamp road construction in Louisiana will stand out as a monument in the coming years to those who are responsible for the work.

Florida has been making splendid progress in developing a system of main roads where there are many serious problems to overcome. Considering the difficulties and the relatively undeveloped status of the state, perhaps none have gone ahead with more courage than has Florida. The states of Kentucky and Virginia have been greatly handicapped by lack of adequate funds, and have necessarily depended upon the counties to help meet the tremendous demands for road improvement. The state of Virginia, by adopting state-wide maintenance, has made a tremendous improvement in the serviceability of its system during the past few years.

The latest report from North Carolina (September)

shows the progress on the state highway system as follows: Completed, 1708 miles, cost $31,402,000; under construction, 1444 miles, cost $29,393,000; and under contract, 187 miles, cost $3,642,000. The wonderful progress in this state since the first bond issue has been a demonstration of results through efficient, courageous administration and organization.

These figures do not show what has been perhaps the most remarkable accomplishment, that is, the maintenance and betterment of the whole state system, extending road service into all sections, and tying it together by the bonds of common interest. When North Carolina was selected as one of the states in which to make an extensive tour for the benefit of the Latin-American engineers who were here to study highway building, the party were received with an outburst of hospitality and generous friendship throughout the state. While the state is hospitable and the welcome was genuine, there is only one way to account for the tremendous enthusiasm, and that is that it was the first opportunity many sections of the state had had to pay tribute to Frank Page, who is chairman of the State Highway Commission, and has been the leader in the remarkable progress that North Carolina has made.

One of the outstanding highway developments in the South has been the construction of important bridges. Many of the larger streams require large and expensive structures to bridge the open water, and in addition the approaches lie over swampy ground for considerable distance on one or both sides of the stream. These streams, and particularly the approaches, have formed barriers to overland travel through all the years. Probably no more important work has been done than the building of important state and interstate bridges to connect and consolidate the interests of the whole South. The story of highway improvement in the South is one of progress, and it has practically all been written within fifteen years. With the remarkable progress in this short time it is evident that another decade will bring about an expansion and perfecting of the highway system that will do away with isolation of any district, will supply adequate transportation facilities to connect with and extend the availability of rail transportation, and will tie together all the more those who live north and those whose homes are south of the Mason-Dixon line.

Motor Vehicles and Highway Development in the South

The South Has Ten Times as Many Motor Vehicles as It Had in 1915, 49 Per Cent More Than the United States Had in 1915 and 20 Per Cent of the World's Total Number. The South Spent $51,000,000 More on Highway Work in 1923 Than the Whole Country Spent in 1914

Motor vehicle registration of the United States for the calendar year of 1923 was 15,092,177, as compared with 12,238,375 in 1922, an increase of 23 per cent. The South in 1923 had a registration of 3,645,563 motor vehicles, compared with 2,849,221 in 1922, or a gain of 28 per cent. In 1915 the South had 354,858 motor vehicles, compared with 2,445,664 in the United States that year. In 1923 the South had over ten times as many motor vehicles as it had in 1915, and the whole country's increase since 1915 is over 517 per cent.

The South has over 49 per cent more motor vehicles than were in the United States as late as 1915. In 1915 the South had less than 15 per cent of the country's motorcars and trucks, and in 1923 it had nearly one-quarter of the country's total motor-vehicle registration.

On July 1, 1924, 15,572,077 motor vehicles were registered in the United States, representing an increase of 2,549,650 vehicles, or 20 per cent over the registration of July 1, 1923, according to the Bureau of Public Roads of the Agricultural Department.

The Bureau of Public Roads reports that there is in the United States one motor vehicle for each 6.6 persons. The greatest number of motor vehicles in proportion to population is found on the Pacific Coast, where there is one motor vehicle to 3.4 persons. The lowest number is found in the East South Central states, where the ratio is one to 13.6, but this section showed a gain in registration July 1, 1924, over the corresponding date of 1923 of 32 per cent, the greatest of any group of states.

The total number of motor vehicles in the world in 1923 was 18,023,584. Of this number 88 per cent is owned in the United States and 20 per cent of the world's motor vehicles are owned in the South.

The South has 1,200,000 more motor vehicles than all the world outside of the United States. It is difficult to comprehend such a remarkable fact, attesting, as it does, the truly amazing progress of this section. In comparison with the South's 3,645,563 motorcars, Great Britain has a total of about 1,000,000 cars, including Canada and Australia; France has 450,000, and Germany a little over 150,000, so that in Germany one inhabitant in every 400 owns a car, against every 6.6 persons in America.

From 1922 to 1923, the Southern states reported increases in automobile registration ranging from 21 to over 40 per cent. The total gain for the South in this period was 28 per cent, compared with 23 per cent in the whole country. Alabama had 11,634 motorcars and trucks in 1915; in 1923, motor-vehicle registration had increased to 126,642. The gain in 1923 over 1922 was 41 per cent. In 1915, West Virginia had only 13,279 motor vehicles, as compared with 157,924 in 1923. The number of motor vehicles in West Virginia was 40 per cent greater in 1923 than in 1922.

Texas, with 688,233 motor vehicles, has the largest registration of any Southern state, followed by 476,598 motorcars and trucks in Missouri, 307,000 cars and trucks in Oklahoma, and 218,896 in Virginia. Texas in 1915 had 40,000 automobiles, Missouri had 76,462, Oklahoma 25,032, and Virginia 21,357.

Texas has more automobiles than France and Germany combined, Missouri has more automobiles than France,

and each of eleven Southern states has more motor vehicles than the whole of Germany.

The total number of motorcars and trucks registered in the South, by states, in 1915, 1920, 1921, 1922 and 1923, with the percentage of gain in 1923 over 1922, is given in the following table:

Every issue of the MANUFACTURERS RECORD gives in detail every week a complete record of all highway work planned or undertaken in the sixteen Southern states, making it invaluable to engineers, contractors and all others who are interested in this line of work.

It is a striking fact that the South is now spending

MOTOR VEHICLE REGISTRATION IN THE SOUTH AND UNITED STATES, 1915-1923

States	Total cars and trucks 1915	Total cars and trucks 1920	Total cars and trucks 1921	Total cars and trucks 1922	Total cars and trucks 1923	Per cent increase 1923 over 1922
Alabama	11,634	74,637	82,366	90,052	126,642	41
Arkansas	8,021	59,082	67,408	84,596	113,300	34
District of Columbia	8,009	34,161	40,625	52,792	74,811	42
Florida	10,850	73,914	97,957	116,170	151,990	31
Georgia	25,000	146,000	131,976	143,423	173,889	21
Kentucky	19,500	112,683	126,802	154,021	198,377	29
Louisiana	11,380	73,000	77,885	102,284	136,622	33
Maryland	31,047	102,841	136,249	165,624	*169,351	*2
Mississippi	9,669	68,486	65,039	77,571	104,286	35
Missouri	76,462	297,008	346,437	392,523	476,598	21
North Carolina	21,000	140,860	148,627	182,550	246,812	35
Oklahoma	25,032	212,880	221,300	249,659	307,000	23
South Carolina	15,000	93,843	89,836	95,239	127,467	34
Tennessee	7,618	101,852	117,025	135,716	173,365	28
Texas	40,000	427,693	467,616	526,238	688,233	31
Virginia	21,357	115,470	139,200	168,000	218,896	30
West Virginia	13,279	80,664	93,940	112,763	157,924	40
Total	354,858	2,215,074	2,450,288	2,849,221	3,645,563	28
United States	2,445,664	9,231,941	10,465,995	12,238,375	15,092,177	23

* Non-resident registrations included in Maryland figures previous to 1923, which accounts for small increase over 1922. About 14,000 non-resident cars were registered in Maryland in 1922.

Increase in motor-vehicle traffic and highway improvement go hand in hand. The vast amount of good-roads work which has been done in the past decade, and it is steadily increasing, is a factor not to be overlooked in the development of the motorcar industry of the United States. The country is now spending annually about $1,000,000,000 on good roads, compared with an expenditure of $59,527,000 in 1904 and $240,263,000 in 1914. Approximate highway expenditures in the South now run in the neighborhood of $291,000,000 annually, compared with $57,517,000 spent on similar work in the South in 1914. Highway improvements in the South in 1923 amounted to $51,000,000 more than the whole country spent on good roads in 1914.

about one-third as much money on highway building as the entire country, a remarkable indication of its appreciation of the value of improved roads and its readiness to spend money for them.

Under the system of issuing state bonds, taken care of as to interest and final redemption by a gasoline tax, highways can really be built without costing the state or individuals a dollar. This situation is due to the fact that improved roads so lessen the consumption of gasoline per mile and the wear and tear on cars and tires that the automobile owner actually makes money by paying a gasoline tax in order to get good roads.

In the following table is given the total highway expenditures in the various Southern states for 1904-1923:

APPROXIMATE HIGHWAY EXPENDITURES IN THE SOUTH

(Compiled from U. S. Bureau of Public Roads)

States	1904	1914	1921	1922	1923
Alabama	$378,040	$3,949,019	$4,065,000	$7,401,208	$14,503,000
Arkansas	681,934	1,522,696	23,300,000	11,992,958	10,496,000
Florida	437,184	2,280,255	5,180,000	10,076,382	19,876,000
Georgia	894,936	3,688,172	25,153,000	8,350,000	18,818,000
Kentucky	1,161,194	2,474,621	8,500,000	13,705,874	15,647,000
Louisiana	345,452	1,777,572	12,430,000	12,584,835	15,142,000
Maryland	873,471	6,000,652	8,850,000	7,408,808	8,873,000
Mississippi	339,669	3,960,377	6,000,000	17,811,174	14,147,000
Missouri	1,570,801	5,513,049	13,675,000	18,398,795	27,550,000
North Carolina	624,381	5,215,491	8,078,000	23,037,084	36,148,000
Oklahoma	447,320	2,112,681	9,800,000	10,389,500	14,207,000
South Carolina	334,082	1,024,480	5,600,000	9,000,696	8,521,000
Tennessee	729,141	2,370,560	11,000,000	11,243,309	15,098,000
Texas	2,543,613	9,920,079	51,481,000	54,222,986	35,106,000
Virginia	687,751	3,224,529	11,400,000	14,986,038	16,148,000
West Virginia	587,870	2,483,747	9,000,000	12,300,204	21,665,000
Total	$12,686,889	$57,517,980	$213,512,000	$242,909,851	$291,945,000
United States	$59,527,170	$240,263,784	$767,420,000	$898,352,307	$1,000,000,000

Iron Ore Resources of the South*

By Ernest F. Burchard, United States Geological Survey

Almost striking feature in the distribution of iron ore in the United States is its occurrence throughout the length of the Appalachian province, from New Jersey and Pennsylvania on the northeast, throughout the Virginias, Carolinas and Tennessee to Alabama on the southwest. Other iron-ore areas in the South belong to regions of less relief in west-middle Tennessee, southeast Missouri and northeast Texas, with a geologic history different from that in the mountain territory.

Ernest F. Burchard

The accompanying map indicates the areas in which iron-ore deposits are found, together with the distribution of blast furnaces, while the map of Southern coal fields accompanying the paper, by W. T. Thom, Jr., shows the proximity of the coal fields to the iron-ore areas. The advantageous situation of the Southern iron-ore deposits, close to coking coal and good fluxing limestone, has called into existence both large and small blast-furnace plants at or near the iron and coal mines, and has resulted in the production of foundry and basic pig iron at costs lower than elsewhere in the United States. Pig iron of Bessemer grade is made from local ore at Johnson City, Tenn., where high grade magnetite from North Carolina is available. The largest iron-producing center in the South is at Birmingham, Ala. There, as well as at Gadsden, Ala., and at Chattanooga, Tenn., plants have been built for the manufacture of steel by the basic open-hearth process.

Birmingham District

Birmingham is the center of the iron-producing district in the South, is second in rank in the country's ore production and compares favorably as a producer of iron and steel with Pittsburgh, Youngstown and Chicago.

The "Birmingham district" comprises an elliptical area about 75 miles in length, about 40 miles from the northwest to the southeast limit. Birmingham lies near the middle of this area. It includes extensive deposits of red hematite, large though less important deposits of brown and gray iron ores and excellent beds of coking coal, and fluxing limestones and dolomite.

The city of Birmingham and its suburban manufacturing towns are in the valley between the Cahaba coal field on the southeast and the Warrior coal field on the northwest. The topography is characterized by long, narrow, canoe-shaped troughs, mostly parallel to each other and separated by well-defined ridges, their form being directly dependent on the geologic structure and character of the underlying rocks along the axes of the anticlines, the most enduring strata, on the limbs of the folds, forming the rims of the valleys. At distances of two to five miles apart "gaps" reaching to the valley level cut at right angles through the ridges and afford convenient passageways connecting the valleys. Red Mountain, the main minor ridge within Birmingham Valley, furnishes nearly all the red ore mined in the district, and the Woodstock area, in the southwestern portion of the valley, produces the major part of the brown ore. Coking coal is mined in the Warrior coal field, only a few miles distant from the furnaces. The dolomite and limestone for fluxing lie both below and above the red ore. The simple, uniform

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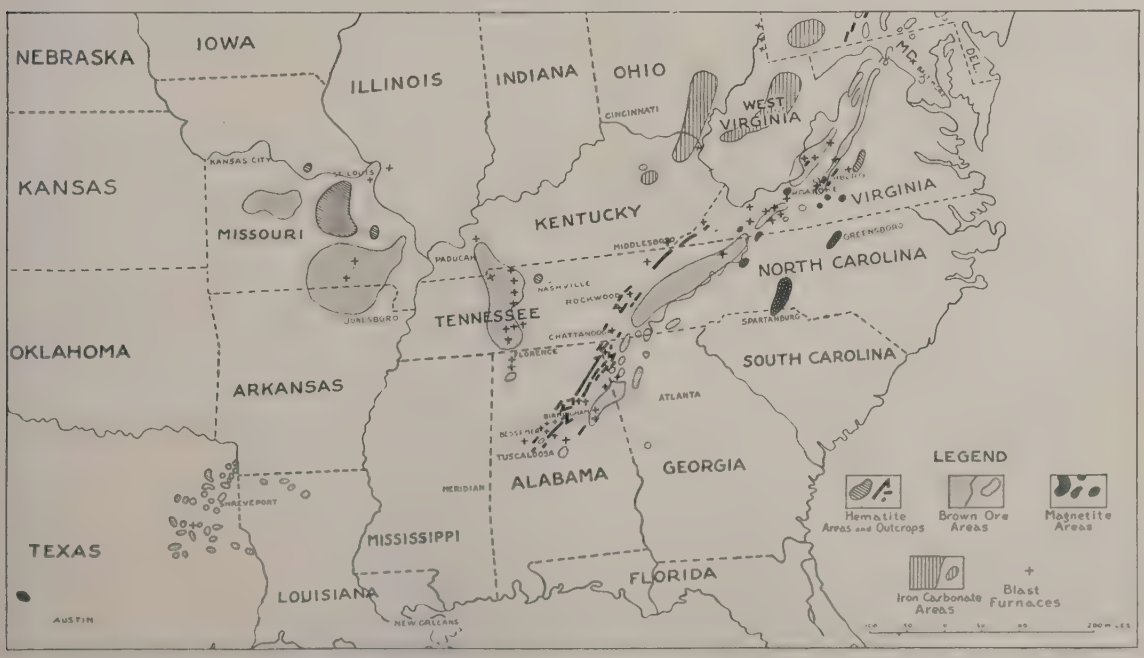


IRON ORE AREAS AND BLAST FURNACES IN THE SOUTH

topographic features have made the ores and stone accessible wherever they are workable, and the enterprising railroad companies have improved the opportunities for developing the region.

The Red Ore

The Red Mountain ore consists essentially of red hematite, intimately mixed with varying percentages of lime carbonate and silica. The hematite occurs in beds interstratified with shale and sandstone, and the strata mostly dip at angles varying from 15 to 45 degrees. In places the ore is oolitic, and some beds are very fossiliferous. In places the ore beds are composed largely of fine to coarse silica pebbles, coated and cemented with ferric oxide. According as the ore tests high or low in lime it is termed "hard" or "soft" ore, the distinction being based on differences in chemical composition rather than in hardness. The unaltered ore is termed "hard." The soft ore has resulted from the leaching of the soluble lime carbonate contained in the hard ore by percolating waters. With the removal of the lime carbonate from the original ore, the relative percentages of the remaining less soluble constituents, mainly iron oxide and silica, increase. Very little soft ore now remains to be mined except in an area where the silica is rather high. The following analyses show at the left (No. 1) a typical hard ore, and at the right (No. 4) a typical soft ore, with intermediate grades between, all from the same mine:

Analyses of Clinton Iron Ores: Graduation From Hard to Soft Ore

	1	2	3	4
Iron, metallic (Fe)	37.00	45.70	50.44	54.70
Silica (SiO_2)	7.14	12.76	12.10	13.70
Alumina (Al_2O_3)	3.81	4.74	6.06	5.66
Lime (CaO)	19.20	8.70	4.65	.50
Manganese (Mn)	.23	.19	.21	.23
Sulphur (S)	.08	.08	.07	.08
Phosphorus (P)	.30	.49	.46	.10

Although the soft ore carries a higher percentage of iron, the hard ore has the advantage of containing often nearly enough lime to flux the contained silica. When a hard ore contains more lime than is needed to flux its silica, soft or brown ore may be added to take up the excess of lime.

Four ore-bearing beds are known, but the only workable beds are the Irondale and Big Seams. The workable portion of the Irondale Seam extends from Morrow Gap to Hedona, about 51,000 feet, or nearly 10 miles. The thickness of workable ore is 3½ to 4½ feet. The hard ore carries 33 to 36 per cent iron, 16 to 25 per cent silica and 8 to 14 per cent lime. The ore is not self-fluxing. The thickness of the bed, so far as known, does not diminish in the direction of the dip within distances practicable for mining from existing incline-shafts.

The workable part of the Big Seam, viz., its middle part in the northeast end of the district and its upper bench farther southwest, extends from Bald Eagle to Sparks Gap, a distance of more than 20 miles along Red Mountain. The Big Seam and the Irondale overlap between Bald Eagle and Hedona, so that the total length of the iron-ore area along Red Mountain is approximately 24 miles. The thickness of the workable part of the bed ranges from 6½ to 12 feet, the hard ore carrying 34 to 39 per cent iron, 10 to 26 per cent silica and 9 to 20 per cent lime. About the middle of the district the bed divides into two "benches," either by a parting along the bedding plane or by a shale bed which thickens gradually to the southwest. The middle of the Big Seam is the workable part in the northeast end of the district, but the upper bench is of most importance throughout the rest of the area. Near the middle of the district the lower bench contains a few feet of ore that may eventually be mined.

Mining Developments

The early stage of development consists of trenching the ore beds along the outcrop and of mining from open cuts. A second stage combined the open cut and outside incline with underground work. The dip of the strata is approximately the same as the southeast slope of the mountain. This slope is cut by natural, narrow V-shaped ravines, on both sides of which the ore seams are frequently exposed from the crest nearly to the foot of the ridge. Inclined tramways are built on the flanks of the ravines, and when the outcrop ore has been worked out entries are driven on the strike of the ore beds from each side. Most of the mines of this kind have been succeeded by the third stage of development, which involves systematic underground work. Main or central slopes are driven generally on the dip, one-quarter to one-half mile apart, from which right and left entries, or "headings," are turned off at intervals of 65 to 200 feet. The ore is mined from the upper side of the heading, sufficient being left as a wall or pillar to protect the workings below until robbing is begun. Recently mechanical loaders, or scrapers, have been installed in a few mines, as a result of which the output per man has been increased. Mules haul the ore-cars to and from the main slope, up which the ore is drawn by a cable, either in trips of cars or in a skip to a tipple, below which it is crushed and loaded directly into railroad cars for transportation to the furnace. Ground water has not been encountered in serious quantities in workings of this type, except where the rocks are faulted or have been fissured through caving of the roof.

Operation by vertical shafts is a fourth stage. The ore bed can be reached more directly by vertical shafts 1000 to 2000 feet in depth than by slopes three or four times those lengths. The initial expense of such shafts would be greater than that of extending the slopes in depth, but it is believed that a greater quantity of ore can be handled and that the cost per ton would fall below that of slope mining.

In the last 10 or 12 years considerable core drilling has been done southeast of Red Mountain. One of the pioneer deep holes, the Shannon-McDonough, about 3 miles southwest of Oxmoor and 14,500 feet southeast of the red-ore outcrop, reached the Big Seam at a depth of 1902 feet, showing 19 feet 6 inches of ore in two benches parted by 4 inches of shale. The top bench, 9 feet 6 inches in thickness, was composed of self-fluxing ore carrying more than 39 per cent metallic iron, and the lower bench, 9 feet 8 inches, was more siliceous and less limey, but was a fair grade of ore nevertheless. The sinking of an inclined shaft was begun which finally reached the ore in 1920. Another shaft, begun during the World War, was practically completed to the ore at a depth of about 1250 feet, approximately 8000 feet from the outcrop at the Woodward mines. These developments mark the beginning of the deep-shaft stage of mining in the Birmingham district, which will increase gradually after the value of the investments in slope mining and in railroads connecting the slope mines with the blast furnaces has been more fully returned.

In an earlier paper I stressed the importance of conservation of the ore, particularly with regard to saving, by immediate mining and utilization, or by protecting for future mining, the great reserves of unused red ore in the

lower bench of the Big Seam. It was apparent that the ore of the lower bench, in some places equivalent to one-third or more of the thickness of the upper bench, was destined to be irretrievably lost unless mined along with the ore of the upper bench, and efforts have been made in recent years to conserve it. One factor encouraging this effort is that many slopes are now a mile or more in length, involving an investment that demands the greatest possible output. Another factor is the study of ore-beneficiation methods begun by the United States Bureau of Mines at the experiment station at Tuscaloosa, Ala.

The output of hematite in the Birmingham district in 1923 was 5,740,233 gross tons, and the annual production during the last 15 years has ranged between this figure and 2,500,000 tons. The total output of ore of this type since 1880 has been somewhat more than 107,000,000 gross tons.

The Brown Ore

Brown iron ores (hydrous iron oxides) are mined at several places near Woodstock, about 30 miles southwest of Birmingham, and at other places farther from the city. Nearly all the workable deposits have been found directly associated with two groups of rocks: (a) Cambrian limestone and shale, and Cambrian and Ordovician dolomite, and (b) Cretaceous and Tertiary clays, sand and gravel. The ore occurs in irregular masses in clay, sand, loam and gravel, at or near the contact of this unconsolidated material with the underlying limestone or dolomite beds. The deposits are well toward the tops of the hills, and in places possess a thickness of 75 feet or more.

Washed, picked and screened brown ore in the Woodstock area carries, in carload lots, 41 to 54 per cent metallic iron, 10 to 20 per cent silica, 2.25 to 6.5 per cent alumina and 5 to 7 per cent water. Manganese and phosphorus run irregularly. The manganese may be as low as 0.20 per cent in one mass of ore, while on the opposite side of the hill it may be more than 1 per cent. Production of brown iron ore in the Birmingham District in 1923 was 306,675 gross tons of concentrate, the annual output having ranged in the last 15 years between 180,000 and 535,000 tons. The total production of this type of ore since 1880 appears to be about 15,000,000 gross tons.

The Gray Ore

A type of iron ore that has as yet been little developed is the specular hematite, or gray ore, with which is associated a little magnetite, that occurs in a belt in Talladega county, about 40 miles southeast of Birmingham. These ores have been described by several geologists,* and they were examined by the writer in connection with a study of potash in iron ores during the World War. The ore is in veins or bands up to 15 feet or more in thickness, interstratified with Cambrian (?) slate and quartzite. The ore has a linear extent of many miles in the ridges of the Talladega Hills, and it has been demonstrated that there is a vast tonnage of ore easily accessible by railroad spurs. The ore bands dip steeply, and mostly will have to be mined underground, although some has been mined from surface cuts. Analyses published by Philip S. Smith show a range in silica from 4.40 to 40.10 per cent, the average being 19.94 for 23 samples, and the metallic iron ranged from 61.37 to 31.74, averaging 50.67. Grasty gives the following percentages: Metallic iron, 53 to 45; manganese, 0.1 to 0.5; sulphur, 0.007 to 0.4; phosphorus, 0.15 to 0.29; silica, 15 to 26; alumina, 2 to 4; and lime. 0.20 to 1.50, from which it may be seen that the ore is of good quality. Blast-furnace tests of the ore have been conducted in which comparisons were made between the reducibility of red ore, brown ore and gray ore, and while the brown ore may appear to possess slight advantages, the conclusions of the engineer in charge of the tests were to the effect that the gray ore has a value equal to that of the average brown ore used in Alabama. Brown ore supplies are becoming depleted, although not at the rate prophesied 10 or 15 years ago, because more efficient methods of mining and concentrating are prolonging the productivity of the deposits. The logical outlet for this gray ore will, therefore, probably be in those blast furnaces either near Birmingham or in eastern and northeastern Alabama, which can be supplied with red ore containing more than enough lime to be self-fluxing, and which are now using considerable brown ore. The low-lime, high-silica red ores, which may be situated nearer the blast-furnaces, will, of course, compete with the gray ores, and so the costs of mining and transportation will be important factors. A significant possibility concerning the gray ore is that it may be susceptible to methods of treatment for the removal of silica by concentration, and thereby yield a very high iron concentrate.

In connection with the gray ores should be mentioned deposits of Cambrian (?) hematite of a reddish, instead of a gray, color that occur in Columbiana Mountain, in Shelby county. According to Butts* the deposits are lenticular beds having a thickness of a few inches to 7 feet and in one section 7 feet of good ore is shown, underlaid by 3 feet of low-grade ore. The ore is interbeded with shale and sandstone, similar to that of the Red Mountain formation. One bed has been prospected for two miles along its outcrop. Analyses show 31 to 54 per cent iron, 21 to 36 per cent silica, 1.6 to 3.7 per cent alumina, a trace to 0.77 per cent phosphoric acid and about 0.11 per cent sulphur. The iron probably averages as high as in the gray ore, but the silica is higher.

Output of Pig Iron

In the Birmingham district blast furnaces are situated within the city, and at North Birmingham, Bessemer, Ensley, Oxmoor, Woodward and Thomas, 26 stacks being on the active list in 1923. Elsewhere in Alabama, at Alabama City, Gadsden, Rock Run, Shelby, Holt, Florence and Sheffield, there is a total of 11 plants, besides a few that have been out of blast for some time. In the last 14 years the pig iron production of the Birmingham district has ranged between 1,062,201 gross tons in 1921 and 2,305,393 gross tons in 1923. The district produces more than 81 per cent of the Alabama pig iron and nearly 6 per cent of the United States total.

Chattanooga District†

Chattanooga, Tenn., occupies an exceedingly advantageous position for a manufacturing center. Tributary to its blast furnaces are many miles of outcrop of red hematite in east Tennessee, northeast Alabama and northwest Georgia. Practically the Chattanooga district includes the area from Lafollette, Tenn., southeast to Attalla and Gadsden, Ala.

The bedded red hematite of Silurian age, locally known as "Rockwood" in Tennessee, and as Red Mountain and Clinton in Alabama and Georgia, the mainstay of the

* Smith, P. S., "The gray Ores of Talladega county, Alabama," United States Geological Survey, Bulletin 315, pp. 161-184, 1907; Grasty, J. S., "The Iron-Making Potentialities of Eastern Alabama," Manufacturers Record, November 30, 1916, pp. 43-45; "Potash as a By-Product," Chem. and Met. Eng., Sept. 26, 1918, pp. 434-438.

* Butts, Charles, "Iron Ores in the Montevallo-Columbiana Region, Alabama," United States Geological Survey, Bulletin 470, 1911, pp. 215-230.

† Burchard, E. F., "The Red Iron Ores of East Tennessee," Tennessee State Geological Survey, Bulletin 16, 173 pp., 1913; also "The Red Iron Ores of East Tennessee, Northeast Alabama and Northwest Georgia," United States Geological Survey, Bulletin 540, pp. 279-328, 1914.

Southern iron industry, underlies the great plateau areas, such as the Cumberland Plateau, Walden Ridge, Sand Mountain, Lookout Mountain and Pigeon Mountain. These are all broad synclinal areas, and the ore outcrops in the valleys bordering these plateaus. There are lesser areas within the valley of east Tennessee and northwest Georgia, where the iron ore underlies narrow synclinal basins whose continuity has been broken by erosion.

In northeast Tennessee a bed of "Rockwood" ore about 4 feet thick outcrops along the foot of the Cumberland escarpment, and is probably continuous beneath the Cumberland Plateau between Powell Valley and Elk Valley, the outcrop in Elk Valley being due to faulting and erosion. There may be a basin, therefore, 1500 to 3000 feet below the Cumberland Plateau, extending from Lafollette to Elk Valley, in which would be a reserve of hard ore about 4 feet thick, aggregating 1,250,000,000 long tons.

In central-east Tennessee there are no lengthy outcrops of workable ore, but the beds are thicker and supply the largest blast furnaces in the state, at Rockwood. In southeast Tennessee the greater part of the ore outcrop falls below 2 feet in thickness, and near Chattanooga the beds have been rather completely mined by stripping on the outcrop. Placed end to end, the outcrops of "Rockwood" ore along the base of the Cumberland escarpment, only a single seam being considered, would aggregate 160 linear miles, and including the valley outcrops would bring the total linear outcrop of "Rockwood" ore beds in east Tennessee to 245 miles. Probably 60 miles of the outcrop may be considered as workable for hard ore, to whatever distances below the outcrop economic mining may be possible.

Southward from Chattanooga the iron-ore beds increase in thickness toward and into Alabama and Georgia. There is considerable hard ore near Trenton, Ga., in Lookout Valley and Pudding Ridge, also under Pigeon Mountain near Estelle, that can be brought to the Chattanooga furnaces at a low cost. Southwest of Trenton and Estelle are bodies of ore that have been mined and shipped to Chattanooga. On the west side of Lookout Mountain they extend as far as Attalla, Ala., and on the east to Gadsden, Ala., comprising not only the area outcropping at the base of the mountain but such valley-outcrops as those of the Dirtseller and Taylor Ridge areas. The thickness of the iron-ore beds in northeast Alabama and northwest Georgia ranges from a few inches to about 5 feet, but generally not more than 3 feet.

The iron-ore areas in northeast Alabama lie principally in the Fort Payne quadrangle. The southwest extremity extends a few miles into the Gadsden quadrangle, and the northeast portion into the Stevenson and Rome quadrangles. Placed end to end this outcrop aggregates about 160 miles, with possibly 75 miles of workable ore. Within the state of Georgia the outcrop of the iron-ore formation aggregates about 175 miles, but a considerable part is not of workable thickness.

The following table presents a few typical working analyses of hard and soft iron ores from mines in east Tennessee, northeast Alabama and northwest Georgia:

ANALYSES OF "ROCKWOOD" IRON ORE FROM TENNESSEE, ALABAMA AND GEORGIA

Locality	*Authority	Fe	SiO_2	Al_2O_3	CaO	Mn	P	S	Water
East Tennessee:									
Hill City, hard ore.....	U. S.	27.30	6.21	3.20	26.53	0.056	0.227	0.068	....
Hill City, soft ore.....	O.	57.50	10.26	1.61	.50	.46	.432	....	3.45
Rockwood, hard ore.....	R.	36.13	5.81	3.83	16.66	....	.083	....	....
Rockwood, soft ore.....	R.	47.27	13.10	6.70	....	....	....	....	....
Chamberlain, hard ore...	U. S.	28.20	5.00	2.82	24.84	.23	.431	.05	5.61
Chamberlain, soft ore.....	U. S.	52.45	7.62	4.31	.40	.23	.532	.02	10.01
Lafollette, hard ore.....	L.	26.30	10.24	8.30	15.89	.60	.61	None	5.00
Lafollette, soft ore.....	L.	44.65	12.48	....	....	....	....	....	....
Northeast Alabama:									
Attalla, hard ore.....	C.	36.97	8.61	....	16.56	....	.50	....	....
Attalla, soft ore.....	C.	53.92	8.39	....	....	....	.676	....	....
Citico, hard ore.....	C.	38.07	10.24	4.17	14.38	.14	.38	....	....
Northwest Georgia:									
Trenton, hard ore.....	O.	29.86	6.76	4.86	24.29	....	.324	Tr.	....
Estelle, semihard ore....	U. S.	41.35	7.21	4.18	11.94	....	.362	.099	....
Hillsdale, soft ore.....	L.	48.70	15.80	6.40	.76	....	.30	.10	.20

*Authorities: C, Citico Blast Furnace Co.; L., Lafollette Iron Co.; O. Owners of property; R, Roane Iron Co.; U. S., U. S. Geological Survey.

Tennessee has about 15 blast-furnace stacks, chiefly in the Valley of the Tennessee in the eastern and western parts of the state. The production of pig iron in Tennessee was 250,982 gross tons in 1923, but this has been considerably exceeded in some former years.

VIRGINIA

Hematite, magnetite and brown ore are all found in Virginia. According to Harder,* the brown ore is by far the most important. Most of the deposits are in the Appalachian region, but on the Piedmont plateau are a few deposits of magnetite and iron sulphide. The Virginia brown ore comprises the well known Oriskany, as well as the "valley" and "mountain" brown ores, which are distinguished chiefly by their geologic relations. The Oriskany is of the greatest value. It occurs as a replacement of the upper portion of the Silurian limestone, the principal deposits being in Alleghany, Shenandoah, Augusta, Botetourt, Pulaski and Wythe counties. The thickness varies from 3 feet to 75 feet. The Oriskany ores carry generally between 40 and 50 per cent of iron, 10 to 25 per cent silica, 0.5 to 4 per cent manganese and 0.06 to 0.5 per cent silica.

The "mountain" brown ores are in Rockingham, Augusta, Rockbridge, Botetourt, Pulaski, Wythe and Smyth counties, forming a discontinuous narrow belt on the west slope of the Blue Ridge as pockets of residual material in clay, also as replacement deposits in shale, and as breccias and veins in quartzite. The latter rock, of Cambrian age, represents the lower limit of these ores. The pockets in clay are the most abundant. The depths may reach 200 feet or more. Many such deposits are found in groups extending along the strike of the rocks for at least 5 miles and have been the sites of open-cut

*Harder, E. C., "Iron ores of the Appalachian Region in Virginia," United States Geological Survey, Bulletin 380, pp. 215-254, 1909.

mining. This variety of ore yields between 35 and 50 per cent metallic iron, and contains 10 to 30 per cent silica, 0.1 to 2 per cent manganese and 0.10 to 2 per cent phosphorus. Manganese occurs in proportions as great as 10 per cent in certain places, so that the ore has been used for the manufacture of spiegeleisen.

The "valley" brown ores extend in a belt bordering the mountain ores on the west and northwest, but overlapping to some extent, especially in the New River district, and they have been extensively mined in Pulaski and Wythe counties. In the Blue Ridge district deposits are found in Page, Augusta and Rockbridge counties. The deposits are irregular in shape, lying on the uneven surface of the limestone. The ore-bearing clay fills depressions between "horses" and pinnacles of limestone. The greatest depth seldom exceeds 50 feet. The "valley" ores are generally of better quality than the mountain ores, containing 40 to 55 per cent iron, 5 to 20 per cent silica, with manganese generally less than 1 per cent and 0.1 to 0.2 per cent phosphorus.

The Virginia hematite consists of two bedded varieties —specular hematite of the Blue Ridge and Clinton fossil hematite. The specular hematite forms a bed 3½ to 6 feet thick in Lower Cambrian quartzite and shale in Botetourt, Bedford and Roanoke counties. It consists of siliceous dark red hematite carrying 35 to 45 per cent iron, 30 to 40 per cent silica, 0.15 to 0.30 per cent manganese and 0.25 to 0.5 per cent phosphorus. The Clinton hematite is interbedded with sandstone and shale of Silurian age. It is of workable thickness only in Alleghany, Lee and Wise counties. The percentage of iron ranges from 40 to 57 per cent, the silica 7 to 20 per cent, manganese about 0.15 per cent and phosphorus 0.4 to 0.7 per cent.

Magnetite is found associated with gneisses, schists and crystalline limestone in the Piedmont region in central and southwestern Virginia, and in small quantities with brown ore and iron carbonate in the southwestern part of the state.

In Virginia there are about 10 blast furnaces that may be considered active, including a few temporarily out of blast. The production of pig iron in 1923 was 276,874 gross tons.

North Carolina

In western North Carolina are two types of commercial iron ore, namely, non-titaniferous magnetite and brown ore. Recent studies of these deposits have been made by Bayley.*

The magnetite in the Appalachian region are most abundant in Ashe and Avery counties, but extend into Carter county, Tennessee. The zones extend in the same direction as the major structural axes. Some are 25 miles long. They mainly lie in a line or in parallel lines, in pre-Cambrian crystalline rocks, mostly granite, schist and quartzite. The largest deposits pass through Cranberry, Avery county, and extend northwest into Carter county, Tennessee. At Cranberry the ore has been mined for more than 100 years, as early as 1820 being reduced in Catalan forges. This mine has been in the hands of its present owners for nearly 50 years, and since 1884 has supplied ore, at first for a small blast furnace at Cranberry, and after 1902 for a larger furnace at Johnson City, Tenn. It is notable because of the low phosphorus content, from a trace to 0.01 per cent. Sulphur also is extremely low. It is hand-picked, or magnetically concentrated, for in the natural state there is considerable siliceous gangue. At the Minnesota School of Mines Experiment Station concentrates with 71 per cent iron have been made by wet magnetic concentration from Cranberry ore carrying about 41 per cent iron. By dry concentration methods a concentrate with 56 per cent iron and 0.01 per cent phosphorus can be made, concentrating 2.5 into 1.

The brown ores of North Carolina are in intermontane valleys in Cherokee and Madison counties, and on the Piedmont Plateau in Catawba, Lincoln and Gaston counties. The mountain brown ores only are of present importance. They are in metamorphosed sediments of Cambrian age, largely in residual clays of the Shady limestone, and similar to the "valley" type of brown ore in Virginia. These ores are of non-Bessemer grade, containing 45 to 50 per cent iron, 0.25 to 1.25 per cent manganese, 0.3 to 0.7 per cent phosphorus and 8 to 18 per cent silica. Some deposits are rated as a low-grade manganese ore.

Western Tennessee Valley

The ores of this region are not related geographically or geologically to any deposits in the Appalachians. The ore-bearing area comprises a narrow belt extending from near Russellville, Ala., northward through west-middle Tennessee, on the east side of Tennessee River, into Kentucky. The ore is of the brown variety, and is usually found in clay, sand and gravel, overlying cherty limestones of Mississippian (Lower Carboniferous) age. It is, for the most part, residual from ferruginous Coastal Plain rocks and Mississippian cherty limestone that lay above the present limestone basement, and in places the large amount of chert and gravel mixed with the ore has required elaborate washing and concentrating plants in order to produce a commercial grade.

The western Tennessee Valley constitutes a self-contained iron-mining and manufacturing unit. The deposits are chiefly in Franklin county, Alabama, and in Wayne, Lawrence, Lewis, Hickman, Dickson, Montgomery and Stewart counties, Tennessee. Several blast furnaces have long been in operation at Sheffield and Florence, Ala., and in Tennessee there are small modern furnaces at Rockdale, Napier, Collinwood, Allens Creek, Wrigley, Cumberland Furnace and Clarksville. The antiquity of the district is attested by the remains of old stone stacks at Hacksberry, Carlisle, Bear Springs and Model, and in other places by heaps of blue-green slag that have outlived the old furnaces. Furnaces in Kentucky, at Hematite and Grand Rivers, formerly drew their ore supplies from this region, the ore being barged down the Tennessee River.

The plants at Rockdale and Clarksville, under the same ownership, are notable as being the only present producers in the United States of blast-furnace ferro-phosphorus. The raw materials for this product are brown iron ore and siliceous washer-tailing from mines near Iron City, Tenn., together with phosphate rock from Mount Pleasant, Tenn. Ferro-phosphorus is used mainly to furnish a definite content of phosphorus to steel. A small percentage of phosphorus is necessary in steel destined to be rolled into thin sheets, and certain other steels, as well as certain pig irons, need the element in definite small quantities. Inasmuch as the basic open-hearth process removes practically all the phosphorus, this alloy affords a means of adding definite proportions of phosphorus conveniently. In connection with the charcoal blast furnaces at Wrigley and Collinwood, large by-prod-

* Bayley, W. S., "General Features of the Brown Hematite Ores of Western North Carolina," United States Geological Survey, Bulletin 735, pp. 157-208, 1922; "General Features of the Magnetite Ores of Western North Carolina and Eastern Tennessee," United States Geological Survey, Bulletin 735, pp. 209-270, 1922; "The Magnetic Iron Ores of East Tennessee and Western North Carolina," Tennessee Department of Education, Division of Geology, Bulletin 29, 1923.

uct plants were built during the World War for recovering tar, wood alcohol and acetic acid, and the plant at Wrigley has been in operation for considerable periods since that time.

Southeast Missouri

At Iron Mountain specular hematite occurs in ancient porphyry, and at Pilot Knob in slate and conglomerate, and was mined on a large scale prior to 1890. Small quantities of ore have since been produced but the ores were thought to be nearly exhausted until recently, when renewed prospecting disclosed a considerable ore body at Iron Mountain. Other deposits of specular hematite are found in the Ozark uplift, such as those in Franklin county, and in a surrounding zone are found many small deposits of brown ore, chiefly in clay resting upon limestone. Deposits of brown ore near Williamsville, Keener and Meta have been mined at intervals for years, and the ore, as well as that from Iron Mountain and Franklin county, is consumed in blast furnaces in the St. Louis district.

Northeast Texas

Foremost among the counties of northeast Texas that contain promising deposits of brown ore are Cass, Morris, Marion and Cherokee,* and deposits of possible future value lie in Upshur, Harrison, Anderson and Henderson counties. There are many deposits of limonite which are found to grade into iron carbonate below the weathered zone. Both the brown and the carbonate ores occur in nodular and geodal forms, segrègated in glauconitic sand and clay in thin lenses and irregular ledges, and also as more or less honeycombed thin sheets and layers, fine fragments, crusts, small isolated nodules and irregular masses of almost endless variety. The brown ore occurs also, particularly in central Cherokee county, in a rather persistent bed, 1½ to 4 feet thick, near the top of the highest tableland.

Most of the surface brown ores of northeast Texas carry good percentages of iron, an average of many analyses showing 45 to 55 per cent. The silica and alumina, however, constitute 9 to 33 per cent. Phosphorus generally ranges between 0.1 and 0.2 per cent and sulphur between 0.01 and 0.2 per cent. Phillips† regarded the northeast Texas iron ores as the very best in the country.

The iron ores of northeast Texas are not being mined at present, although in earlier years there was both iron mining and manufacturing in that region. Two blast furnaces were formerly operated near Jefferson, Marion county, and in the vicinity of Rusk were three furnaces, one being the property of the state of Texas, which, with its associated ore mines, was operated by convict labor. Much of the pig iron produced was remelted and cast into iron pipe at an adjoining pipe foundry, also owned and operated by the state. This furnace was moved to Collinwood, Tenn., during the World War, and erected in connection with a large charcoal by-product plant. One of the furnaces near Jefferson is reported to have been moved to Haigart, Howell county, Missouri.

Prospecting has disclosed large reserves of ore in this region, and experimental work has proved that it can be concentrated successfully.

Central Texas

Deposits of magnetite, and mixed magnetite and hematite, occur in Llano and Mason counties, Texas,‡ interlayered with crystalline schist. The ore contains 54 to 67 per cent iron, 4 to 10 per cent silica, 0.28 to 0.55 per cent sulphur and a trace to 0.093 phosphorus. It is reported that many small bodies of ore are present. A few are of such size as to warrant further exploration, especially by magnetic surveying.

Production of Iron Ore in the South and in the United States, 1890 to 1923, Gross Tons

Year	The South	United States
1890	3,516,202	16,036,043
1891-1895	17,183,185	70,312,766
1896-1900	20,657,603	105,193,545
1901-1905	27,607,458	169,631,385
1906-1910	31,687,266	243,762,860
1911-1915	29,319,130	257,973,387
1916-1920	36,090,371	348,684,684
1921	3,020,691	29,490,978
1922	5,521,839	47,128,527
1923	7,436,949	69,351,442
Total	182,040,694	1,357,565,617

Southern pig-iron production is derived principally from Alabama, Maryland, West Virginia, Virginia, Tennessee and Kentucky, although three of these states—Maryland, West Virginia and Kentucky—produce little or none of the iron ore that they consume. This is readily explained by the fact that the West Virginia and Kentucky blast furnaces are near the Ohio River, practically within the Pittsburgh district, and can obtain ore cheaply from the Lake Superior ranges. The Maryland furnaces are on Chesapeake Bay, and are supplied mainly with high-grade ore shipped by boat from Chile and Cuba. In 1923 the pig-iron production of the six principal producing states was as follows, in gross tons: Alabama, 2,797,190 tons; Maryland, 529,606 tons; West Virginia, 507,582 tons; Virginia, 276,874 tons; Tennessee, 250,982 tons, and Kentucky 180,271 tons.

The following table shows that in the period beginning with 1880 the South has produced nearly 14 per cent of the United States total:

Pig-Iron Production, 1880-1923, Gross Tons

Year	The South	United States
1880	448,978	3,835,191
1881-1885	3,175,623	21,505,481
1886-1890	6,204,752	35,396,560
1891-1895	8,289,593	40,665,068
1896-1900	10,959,343	57,459,686
1901-1905	15,054,451	91,198,326
1906-1910	16,024,014	120,123,608
1911-1915	15,189,110	137,591,093
1916-1920	21,883,153	185,052,008
1921	1,729,145	16,688,126
1922	3,360,828	27,219,904
1923	4,557,106	40,361,146
Total	106,876,096	777,096,197

Iron Ore

The iron-ore production of Alabama leads the other Southern states, and ranks third in the United States, being exceeded only by Minnesota and Michigan. Tennessee, Virginia, Georgia, North Carolina and Missouri follow in order of output. The production of these six states in 1923 aggregated 7,436,949 gross tons of iron ore, or about 11 per cent of the United States production.

The tables on the following page give such figures for the South from 1890 to 1923, inclusive, as are available in the records of the United States Geological Survey:

*Burchard, E. F., "Iron Ore in Cass, Marion, Morris and Cherokee counties, Texas," United States Geological Survey, Bulletin 620, pp. 69, 109, 1915.

‡ Phillips, W. B., "Iron and Steel Making in Texas," Iron Age, Jan. 11, 1912, pp. 141-143.

† Paige, Sidney, "Preliminary Report on Pre-Cambrian Geology and Iron Ores of Llano county, Texas," United States Geological Survey, Bulletin 430, pp. 256-268, 1910.

PRODUCTION OF IRON ORE IN THE SOUTHERN STATES, 1890 TO 1923
(Tons 2240 pounds)

States	1890	1891-1895	1896-1900	1901-1905	1906-1910
Alabama	1,897,815	9,733,787	11,964,352	17,453,878	20,891,516
Georgia	244,088	1,055,559	1,083,350	1,478,729	1,711,298
Kentucky	77,685	236,967	143,777	204,856	182,644
Maryland	35,657	100,276	58,594	71,409	75,096
Missouri	181,690	397,744	274,568	306,215	458,787
North Carolina	22,873	57,562	77,253	235,737	281,446
Tennessee	465,695	2,136,124	2,959,425	3,752,492	3,709,809
Texas	22,000	123,255	59,680	87,331	245,977
Virginia	543,583	3,317,711	4,020,604	3,961,111	4,048,384
West Virginia	25,116	24,200	16,000	55,700	82,309
Total	3,516,202	17,183,185	20,657,603	27,607,458	31,687,266

PRODUCTION OF IRON ORE IN THE SOUTHERN STATES, 1890 TO 1923, CONTINUED

States	1911-1915	1916-1920	1921	1922	1923	Total (1890-1923)
Alabama	23,755,447	30,487,278	2,876,141	5,234,568	6,783,146	131,077,928
Georgia	677,185	923,916	5,556	24,149	117,321	7,321,151
Kentucky	115,873	.....	.....	.....	.....	961,802
Maryland	24,469	25,827	.....	.....	.....	391,328
Missouri	226,003	255,380	36,550	58,408	53,546	2,248,891
North Carolina	346,459	394,223	2,583	17,279	59,684	1,495,099
Tennessee	1,865,121	2,032,647	25,709	156,464	267,275	17,370,761
Texas	10,232	12,400	131	.....	.....	561,006
Virginia	2,270,733	1,950,463	74,021	30,971	155,977	20,373,558
West Virginia	27,608	8,237	.....	.....	.....	239,170
Total	29,319,130	36,090,371	3,020,691	5,521,839	7,436,949	182,040,694

Iron and Steel Development of the South

By B. E. V. LUTY, Pittsburgh, Pa.

IN THE half century from 1873 to 1923 the number of blast furnaces in the South decreased by 32.6 per cent, from 144 in 1873 to 97 in 1923. One must not be disconcerted by this showing, however, for the production of pig iron during this period multiplied more than twenty-fold, being 233,550 gross tons in 1873 and 4,557,106 tons in 1923, or an increase of 1938 per cent.

B. E. V. Luty

The decrease in the number of furnaces was due simply to progress, furnaces being built larger and larger. During the half century the total number of blast furnaces in the United States decreased 34.6 per cent, from 662 to 432, so that the decrease in the South was less than the decrease in the North.

Both 1873 and 1923 were record years in production of pig iron in the United States, so that comparison of these years is trustworthy. In 1873 the South produced 8.7 per cent of the total pig iron and in 1923 11.3 per cent, thus improving its relation by nearly one-third. While production in the South was multiplied by more than 20, production in the remainder of the country was multiplied by only a trifle more than 15.

The distribution of furnaces by states and of production in the two years is shown in the following table, the production figures representing gross tons of 2240 pounds, now the universal standard in measuring pig iron output.

OUTPUT OF PIG IRON IN THE SOUTH

	1873		1923	
	Furnaces, number	Production, gross tons	Furnaces, number	Production, gross tons
Virginia	35	23,600	17	806,480
Maryland	22	50,000	6	
North Carolina	8	1,300	0	0
South Carolina	8	0	0	0
Alabama	11	20,000	43	2,797,190
Tennessee	20	38,600	17	250,982
Georgia	8	6,700	1	702,454
West Virginia	6	20,600	4	
Kentucky	25	62,500	7	
Mississippi	0	0	1	
Texas	1	250	1	
The South	144	223,550	97	4,557,106
All other	518	2,337,413	335	35,804,040
Total United States	662	2,560,413	432	40,361,146
Proportion of South		8.7%		11.3%

NOTE—Missouri is credited with three furnaces in 1923, but the possible production is lumped in the official statistics with that of three Northern states.

The statistics of the increase in pig iron production in the South in a half-century, with the tonnage multiplied twenty-fold and the proportion of the country's total substantially increased, while making a very good showing in the abstract, fall quite short of correctly representing the South's progress in iron and steel. First, because the

early production was largely of foundry iron for the production of iron castings, a relatively low-grade commodity, while in recent years the pig iron has been largely steel-making iron, converted, in the South, into finished steel products, of much higher value than iron castings. Second, because until comparatively recent times the great bulk of the pig iron was sent out of the South in that form, some being exported, but the major part going to Northern consumers, both iron foundries and steel works. Lately the South has come to be a very large consumer of its pig iron, and a consumer of much of the steel it makes from its pig iron.

In 1873, to illustrate, Tennessee produced 38,600 tons of pig iron, with 20 blast furnaces, owned by nearly as many firms, but had only four rolling mills, which in all probability consumed less than half the pig iron made in the state. Alabama, which had 11 blast furnaces in 1873 and produced 20,000 tons of pig iron, entered the year with not a single rolling mill or puddling furnaces, and ended the year with one plant, which had been completed in March, with four puddling furnaces and two trains of rolls, with an estimated annual capacity of 1000 tons of bar iron, including cotton ties. This was the Central Iron Works of Fell & Co. at Helena, Shelby county. There was another iron works in the state, but it had been idle for eight years.

As was very largely the case in the North a half century ago, the South produced its iron where it chanced to find fuel and easily mined ore together. While mineral fuel had come very largely into vogue, one-fifth of all the pig iron made in the United States in 1873 was charcoal iron, and, strange as it may seem, every ton of the Alabama pig iron production in 1873 was charcoal iron, and nearly all of the Tennessee production. At that time one-fifth to one-fourth of the pig iron of the country was being made from Lake Superior ores. The remaining production was nearly all from local ores. There were some movements. For instance, no little ore from Iron Mountain, Missouri, was brought up the Ohio River to blast furnaces in the Pittsburgh district.

The matter before the South, then, was to find its best deposits of iron ore and coal and develop them together. The production of 1873, shown in the foregoing table, may almost be called sporadic. The Maryland production for years was largely from imported iron ore and fuel brought from Pennsylvania and West Virginia. Circumstances surrounding production in Kentucky were not such as to make for permanence, and when it is noted that all the 1873 production by Alabama was with charcoal it is plain that the state had not found itself, for its strength in later years was due to its having coking coal and iron ore as well as limestone for fluxing purposes, all scarcely the distance of a rifle shot apart.

The Critical Year 1890

The year 1890 was a crucial one in the South's iron development. What had come before was fine. What came afterwards was bad. By the early eighties the South had learned how to develop its iron ores if it could get the capital. Capital was rather hard to get, but, fortunately, not a great deal was required by comparison with the standards of recent years in iron and steel. Up to 1890 the South made remarkable progress, and then two things occurred, which will be referred to a little later.

It chances that what needs to be told here was written by the late James M. Swank in his concise and accurate style. We quote his words verbatim, from the Annual Statistical Report of the American Iron and Steel Association for the year 1890, pp. 23-24:

"The rapid development of the pig iron industry in the Southern states in the last few years continues to attract attention. It is noticeable, however, that the progress made by these states in 1890, flattering and gratifying as it was, did not keep pace with that made in 1889, as will be made plain from the following table of production in the six years 1885 to 1890:

Southern Pig Iron Production, 1885-1890

(Tons of 2000 pounds)

States	1885	1886	1887	1888	1889	1890
Alabama	227,438	283,859	292,762	449,492	791,425	914,940
Tennessee	161,199	199,166	250,344	267,931	294,655	299,741
Virginia	163,782	156,250	175,715	197,396	251,356	327,912
West Virginia	69,007	98,618	82,311	95,259	117,900	144,970
Kentucky	37,553	54,844	41,907	56,790	42,518	53,604
Georgia	32,924	46,490	40,947	39,397	27,559	32,687
Maryland	17,299	30,502	37,427	17,606	33,847	165,559
Texas	1,843	3,250	4,383	6,587	4,544	10,865
North Carolina	1,790	2,200	3,640	2,400	2,898	3,181
Total	712,835	875,179	929,436	1,132,858	1,566,702	1,953,459

"Nor did the progress of the Southern states in 1890 keep pace with that of some Northern states. * * * The production of pig iron in Alabama in 1890 shows a much smaller increase, both absolutely and relatively, than in either of the two preceding years. Tennessee, Kentucky, Georgia and North Carolina made only nominal progress in 1890. * * *

"But, if the South did not make as rapid progress in the production of pig iron in 1890 as in 1889, that section of our country may be said to have added in that year an entirely new honor to its metallurgical achievements, namely, the manufacture of basic steel. Previous to 1890 the manufacture of steel by the basic process in the South had been undertaken in the open hearth by the Henderson Steel & Manufacturing Co. at Birmingham, but in the year mentioned a more ambitious attempt to make steel by this process in the open hearth was undertaken at Chattanooga by the Southern Iron Company, and this attempt met with complete success. The first cast was made on September 15. This company is now making basic steel from Southern pig iron in commercial quantities. Some of the steel made by it has been rolled into sheets, and these have been successfully coated with tin at the works of the St. Louis Stamping Company. Several other plants for the manufacture of basic open-hearth steel have been undertaken or projected in Southern states."

Mr. Swank then remarks that with the enactment of the McKinley tariff the South should turn in to make cotton ties, says that all the Catalan forges in North Carolina and Tennessee are virtually abandoned and that "the

Southern Catalan forges die and the basic open-hearth steel process takes their place."

Mr. Swank merely brought out that the progress made in the South was not as great as the astonishing progress that had been made in the immediately preceding years. But a definite backset was coming. The two principal influences were the discovery of the Mesabi iron-ore range in the Lake Superior region and the industrial depression of the nineties.

The panic occurred in June, 1893, and was followed by several years of severe industrial depression. But Burton, in his authoritative work on "Crises and Depressions," says: "The depression in Europe commenced at the end of the year 1890. A survey of the situation affords strong arguments that it was due in the United States at the same time. But while the onward movement was checked, the actual crisis was postponed until 1893. * * * It had become established that one feature before and at the outbreak of a crisis in the United States was the withdrawal of foreign loans." To the South this last point meant a great deal. Much capital was needed for the iron development of the South, and no little of that furnished was foreign capital. The Watts Steel & Iron Co., Middlesborough, Ky., was purely an English concern, and there was much British capital in other works in the South.

In October, 1890, for the first time in its history, the Iron and Steel Institute held its meeting in the United States, then touring the iron districts. If the writer's memory serves him rightly, when the visitors reached Birmingham, Ala., Sir Lowthian Bell, one of the foremost men in the British iron trade, said that while he would not predict that Birmingham would make the pig iron of the world, he would predict that Birmingham would dictate the price at which pig iron would have to be sold.

The visitors were scarcely well out of the country, however, when the second influence developed, by Alfred and Leonidas Merritt discovering the Mesabi range in the Lake Superior region. The Marquette range had been opened in 1854, the Menominee in 1877 and the Vermillion and Gogebic in 1884, but they involved underground mining. The Mesabi was different. Much ore lay practically just under the roots of the grass. It was a steam-shovel proposition, and the prediction that the ore would be "cheap as dirt" was really a poor one, for material produced by a steam shovel is cheaper than most dirt. Nowadays, it is true, mining on the Mesabi range involves much stripping, perhaps considerably more than one foot of overburden per foot of ore to be uncovered; but it was not so in the early years.

Reverting to economic and business conditions, Bessemer pig iron at Pittsburgh dropped from $23.60 in January, 1890, to $13.60 in January, 1893—$10 a ton in three years. That was hard for the Northern industry, but it was established, and could get along even if it did not even hold its own. The Southern industry needed to develop, and to develop it needed capital, which was conspicuously lacking. Its ambition in 1890 was to make basic open-hearth steel, but the capital was not forthcoming, and for years it remained chiefly a producer of pig iron. Little of this was used in the South. Some was exported and much went North, having to pay freight and then compete with Northern pig iron. A few words will depict the condition as to pig iron in the well-established North. The Mahoning and Shenango valleys, in Ohio and Pennsylvania, but close together, were the greatest Northern center in the production of pig iron for sale, and in 1897 and 1898, the years of lowest prices, it was a familiar remark in the trade that the day of the merchant furnaces in "the valleys" was over; that they might make a dollar a ton every third year or so, but it did not matter much, as they had all paid for themselves long before. Mesabi non-Bessemer ore was then selling at Lake Erie ports at $1.70 to $1.80 per ton, and Bessemer at $2.10 to $2.15, this after paying the cost of mining, the rail freight to upper Lake port and the vessel freight down the Lakes.

Andrew Carnegie had employed a geologist for a year to search the Virginias for a suitable supply of iron ore for the Carnegie Steel Company, but the discovery of the Mesabi range stopped that search. In 1890 Birmingham was full of the ambition, well founded in the light of conditions then existing, to make basic open-hearth steel with its pig iron. Instead, the Carnegie Steel Company became the first large producer by this process, and in its early work it used considerable quantities of Birmingham basic iron, which in all probability moved on very special freight rates secured by Mr. Carnegie.

Revival of Iron and Steel Making

Then came the revival in the iron and steel industry. In 1897 the United States made 2 per cent more pig iron than in any previous year, and in 1898 it broke the 1897 record by 22 per cent. All this iron was very low-priced iron, however. It gave consuming industries an opportunity to develop, but it furnished profits, and meager profits even at that, only to the best positioned and most efficient producers. The South had not had the capital to put itself on a really efficient producing basis. In 1899 came still additional demand, and the iron producers were already fairly well engaged. The extra demand forced up prices. The 22 per cent more pig iron in 1898 than in 1897 came out easily, but with only a 16 per cent further increase to 1899 the price situation changed entirely. The strain on productive resources had come. Birmingham foundry iron, delivered Cincinnati, averaged $9.33 a ton in 1897 and $9.46, or 13 cents more, in 1898, but the 1899 average was $16.58, or $7 a ton gain. In

LARGEST BLAST FURNACE PLANT IN THE SOUTH

PANORAMIC VIEW OF A SECTION OF THE ENSLEY (ALA.) STEEL WORKS OF THE

1902 the average was $20. The South had begun to make money of its own.

The first steel making on a large scale in the South occurred just a quarter century ago, the Tennessee Coal, Iron & Railroad Co. pouring its first heat of steel on November 30, 1899, in a plant of ten 50-ton basic open-hearth tilting furnaces, with an annual ingot capacity of 300,000 tons. Even this company, the largest and most successful iron and steel enterprise of the South, did not have easy sailing. Successive owners poured large amounts of capital into it, every expansion showing the need of further expansion, until finally the United States Steel Corporation took over the properties late in 1907. It required the vast resources of the Steel Corporation to show what really could be done, and it has never been related that the management regretted any of its capital expenditures in the property.

At the beginning of this article a table was given showing the pig iron output of the South in 1923 to have been 4,557,106 tons, or 11.3 per cent of the total output of the United States. Owing to the official statistics grouping together some Northern and Southern states of small steel production, the precise figures of production of steel ingots and castings in the South in 1923 cannot be given, but the output was approximately 3,700,000 tons, which was between 8 and 9 per cent of the total output of the United States.

Productive capacity of the Southern states at the end of 1923 is officially reported as follows, in gross tons, respectively, of pig iron and of steel ingots and castings:

	Pig iron, tons	Steel, tons
Alabama	3,748,610	1,494,400
Georgia	72,000	*
Kentucky	496,000	820,000
Maryland	900,000	1,091,000
Mississippi	3,500	.....
Missouri	210,000	287,400
Tennessee	686,650	7,300
Texas	36,000	†10,325
Virginia	827,925	17,850
West Virginia	589,750	1,133,100
Total South	7,570,435	4,861,375
Total United States	52,683,830	59,431,710
Per cent of South	14.4	8.2

* Included in Alabama.
† Including Louisiana.

It is quite impossible to trace the development of all the iron and steel producers of the South who are now doing a thriving business. Mention may be made of a few.

Just at the time when iron making in the South experienced a backset on account of the discovery of the Mesabi range in the Lake Superior iron ore district, a great enterprise in another part of the South was being developed—to use imported iron ore. This was at Sparrows Point, near Baltimore. In August, 1887, the Maryland Steel Company began the erection of four blast furnaces, to use ores from Cuba, Spain and Africa, the first pig iron being made in November, 1889, with an additional furnace completed in each of the three following years. Building of the steel works began in 1889. the first steel being made August 1, 1891. This plant had the two largest Bessemer steel converters in the country, 20 tons capacity each, capable of making 300,000 gross tons of steel ingots per annum. The product was rails, together with billets for sale to other finishing mills. The financial stringency of the early 1890's brought on a receivership for the company, but operations continued. Early in the present century the Bessemer department was rebuilt, three 18-ton converters replacing the two 20-ton converters and increasing the plant's capacity to 500,000 tons of ingots per annum. In 1910 an open-hearth steel department was completed, containing five 50-ton tilting furnaces and increasing the total ingot capacity to 600,000 tons, while using part of the Bessemer equipment for duplexing with the open-hearth furnaces the capacity was about 700,000 tons. By-product coke ovens were built and various other improvements made, the capital being secured by the Pennsylvania Steel Company, operating at Steelton, Pa., which controlled the Maryland Steel Co.

Later, when the Pennsylvania and Maryland Steel companies were acquired by the Bethlehem Steel Corporation (March 1, 1916), further improvements were made. The Sparrows Point plant now has seven blast furnaces, with over 800,000 tons annual capacity, or 1½ per cent of the total pig iron capacity of the country; 360 Koppers ovens, with capacity to make 1,500,000 tons of coke per annum; four 18-ton Bessemer converters, three 25-ton Bessemer converters, four 200-ton basic open-hearth furnaces and five 50-ton furnaces, the total ingot capacity being 1,000,000 to 1,400,000 tons according to whether the plant duplexes or not, or fully 2 per cent of the total steel-making capacity of the country. The product has been diversified by the addition of a plate mill, 10 sheet mills and 24 tinplate mills. The tinplate capacity is between 4 and 5 per cent of that of the whole country. Between $70,000,000 and $100,000,000 was spent on the properties since the acquisition by the Bethlehem Company.

At the time of the Steel Corporation's acquisition of the Tennessee Coal, Iron & Railroad Co. extensive

TENNESSEEE COAL IRON & RAILROAD COMPANY OF BIRMINGHAM, ALA.

improvements were in progress, with more in contemplation. The corporation has since spent very large sums in development of the properties.

The greatest operation was the building of an entirely new plant, at Fairfield, Ala., using hot ingots from the Ensley steel works. At that point are a blooming mill, a combination bar and structural mill and a plate mill. At the same point, under control of the American Steel & Wire Co., another subsidiary of the Steel Corporation, is a complete wire mill, using billets from the other plant and making plain wire, barb wire, nails, wire fencing and various specialties.

The Gulf States Steel Company is one of the newer steel enterprises of the South, having been incorporated November 1, 1913, James Bowron, president, taking over the blast furnace at Alabama City, Ala., built in 1903, and the steel works at the same point, now containing six 50-ton basic open-hearth furnaces. Various improvements to the original works have been made, including the erection, in 1916 and 1917, of a by-product coking plant.

While there are large iron and steel interests in the Ashland (Ky.) and Wheeling (W. Va.) districts, the two outstanding plants of international import located in the South are those of the Tennessee Coal, Iron & Railroad Co. and the Sparrows Point, or Baltimore plant of the Bethlehem Steel Corporation. The Maryland plant of the Bethlehem Steel Company, combining iron and steel and shipbuilding interests, is probably the largest single combination of this kind in the world. It brings its ore in ships built in its own yard from Chile and other foreign lands and its coal for its by-product coking plant from West Virginia. The Tennessee Coal, Iron & Railroad Co. originally started in Tennessee—hence the name—had for many years a checkered career, passing through trying ordeals which taxed the financial ability of its managers. Its stock was for years a football of Wall Street speculation, but after a good many experiments in steel making by other firms had failed of success—in some cases by reason of lack of capital and some by impracticable steel-making methods—this property was purchased in 1907 by the United States Steel Corporation, through a special permission granted by President Roosevelt and largely for the purpose of steadying the panic, which threatened to be even more destructive than it had been up to that time by reason of the fact that the stock of the company pledged for loans was endangering the financial stability of one or two of the great banking houses of New York. Knowing but little of the intrinsic value of the property, J. P. Morgan was loath for the Steel Corporation to purchase the Tennessee Company

AIRPLANE VIEW OF THE BETHLEHEM STEEL COMPANY'S MARYLAND STEEL PLANT AT SPARROWS POINT

until the intrinsic value of that property was made clear to him by Southern men who appreciated the vastness of its ore and coal resources.

Shortly after its purchase some millions of dollars were appropriated by the Steel Corporation for the reorganization and development of the plant on scientific lines. However, when the suit against the Steel Corporation was entered by the Federal Government for dissolution on the claim that it was a monopoly through its ownership of the Tennessee Company's resources, it became necessary for the Steel Corporation to withhold further large expenditures until the question was settled. The judges finally decided unanimously in favor of the Steel Corporation, and then began a period of expansion which has continued up to the present time, and it will doubtless go forward indefinitely in the future, for the resources of coal and iron ore owned by the Corporation in the Birmingham district justify an almost limitless expansion in the future, dependent wholly upon the ability to market its products in this country and abroad at a profit.

During the World War, when the Government was calling for every ship that could be built, the Steel Corporation established a shipyard at Mobile, building ships out of steel made in Birmingham. After the close of the war, when new shipbuilding seemed unnecessary, most of the shipbuilding plant was moved to Birmingham and utilized in the construction of car works, which are in full operation, but the steel ships built at Mobile out of Birmingham-made steel now carry to South America and to the Orient the diversified products of the steel mills of Birmingham.

The enlargement of Southern railroad facilities is constantly demanding an increased requirement for steel rails and cars, locomotives and other products which enter into the construction and maintenance of railroads. The activity in the building of fireproof hotels, office structures, bridges and kindred things is necessarily increasing the demand for Southern iron and steel, and at the same time many of these architectural works are shipping their products to outside markets. It was but a few years ago when the bulk of the pig iron products of the South had to be sold in the North and West. It has recently been estimated that about 85 per cent of the South's pig iron is now consumed in the South. This section has become the center of the iron-pipe-making interests of the United States, and this product is shipped to every part of this country and to foreign lands.

Pipe Making and Its Influence in Creating a Domestic Market for Pig Iron

By Y. A. Dyer, Metallurgical Engineer, Birmingham, Ala.

The manufacture of finished articles of commerce from raw materials obtained reasonably near the base of their production has practically always been the commercial and industrial arch which supports thriving and nationally recognized centers in any country. At least this feature has been the ultimate analysis, or final trend, when the well-rounded history of such communities has been written.

It has been the unvarying rule, in the matter of raw pig iron production alone, that such centers have survived and prospered only when finished-product plants were close at hand or have sprung up in nearby industrial zones, or when widespread price differentials have existed in far removed competitive markets. At best the latter condition has been quite sporadic, and profit taking during such active periods has nearly always been closely followed by actual losses during the succeeding inactive periods.

As applied to the South in particular, the step-manufacture of raw foundry pig iron into finished products was an economic problem permitted to lie dormant many years, though inevitably destined to go forward by sheer force of natural events—the basis of which revolved around cheap raw materials into the plants and favorable transportation rates on finished products out to the open markets.

The brief span of twenty years, from 1904 to 1924, inclusive, has served not only as an epoch to demonstrate the futile effort of the Southern manufacturers of pig iron to exist on profits from the sale of raw pig iron shipped into foreign competitive markets, but an epoch which has opened up prosperity for the South in having its pig iron converted into finished products at home, at comparatively low cost of production, by reason of favorable raw material and labor conditions.

Up to and including the year 1904 practically 70 per cent of the raw foundry pig iron produced in the South, or about 1,592,500 tons, was shipped into Eastern, middle Western and Western territories—fields which were highly competitive—and only 30 per cent, or 682,500 tons, supplied to the domestic, or home markets. The bulk of domestic iron was consumed by a sparse number of pressure-pipe plants, a few soil pipe and fittings plants, car-wheel plants, stove foundries and general jobbing plants.

Up to and including the present year, 1924, the percentage of foundry pig iron moving, from the Southern furnaces into Eastern, middle Western and Far Western territories will have decreased to approximately 20 per cent, or 400,000 tons, while the other 80 per cent, or about 1,700,000 tons, will be melted in the South. As a matter of fact, of the 20 per cent of foreign shipments made and to be made, the bulk will move to radiator plants, car-wheel plants and pipe plants, which are owned by companies controlling like plants in the South.

An analysis of this "right-about" situation of immense pig iron consumption in the South reveals the fact that there has sprung up in this section of the country during the period referred to a finished-product industry of great magnitude and importance, which has developed a production record of immense finished-iron tonnage at a comparatively low manufacturing cost—the cast-iron pipe and fittings industry.

This industry alone will consume in excess of 1,000,000 tons of Southern foundry pig iron during 1924, in about following proportions:

	Tons
Water and gas pipe and fittings	616,250
Special cast-iron fittings	32,500
Soil pipe and fittings	377,850
Total	1,026,600

In the states of Alabama, Tennessee and Virginia there are ten pressure-pipe plants with rated annual capacity of 725,000 tons; in the state of Alabama there are two special cast-iron fittings plants with rated annual capacity of 50,000 tons; and in the states of Alabama, Tennessee, North Carolina and Georgia there are 33 soil-pipe plants with annual rated capacity of 581,400 tons—or a total of 45 plants, with grand total capacity of 1,356,400 tons.

Some fair conception may be had of the iron-consuming capacity of the pipe industry of the South by the simple comparison with total foundry-iron production in the United States and the consuming capacity of all gray-iron foundries in the United States, as follows:

Grand total pig iron production in the United States for 1924 will approximate 29,600,000 tons. Of this total tonnage about 16 per cent, or 4,736,000 tons, will be consumed by a grand total of 4135 active gray-iron foundries —an average consumption of 1145 tons per foundry for the year.

Total pig iron production in the South for 1924 will approximate 3,500,000 tons. Of this total tonnage about 50 per cent, or 1,700,000 tons, will be consumed by 640 active gray-iron foundries located in twelve Southern states—an average yearly consumption of 2656 tons per foundry. Of these 640 shops, 595 comprise stove foundries, radiator plants, agricultural foundries, car-wheel foundries, machinery and general jobbing foundries, consuming about 673,400 tons, or 1132 tons per plant for the year. The balance, or the 45 pipe shops, will consume 1,026,600 tons, or an average of 22,813 tons per plant for the year.

The significant angle of comparison is the fact that while there is located in the South only 15.47 per cent (640 out of a total of 4135) of the gray-iron foundries of the United States, yet from the standpoint of tonnage consumption they melt more than 35.8 per cent (1,700,000 tons out of a total of 4,736,000 tons) of the total strictly gray foundry iron produced in the United States—the pipe and fittings companies consuming 21.7 per cent, or 1,026,600 tons.

In dollars and cents, the total valuation of Southern pipe plants closely approximates $28,629,000, and they will transact a gross business of more than $51,330,000 during the year 1924. Their purchases of pig iron will amount to more than $20,000,000, purchases of coke in excess of $575,000 and limestone purchases $50,000 to $60,000. They employ in excess of 10,000 men and disburse more than $7,500,000 in payrolls, not to mention the great quantity of tools and supplies purchased annually, and the employment given various selling agencies.

In dealing with increased foundry consumption of pig iron in the South the natural sequence is an increased consumption of foundry coke. The average melting ratio "over all" is approximately 8 pounds of iron per pound of coke, or 8 tons of iron to one ton of coke. On this basis there will be consumed in 1924 a total of 212,500 tons of foundry coke, compared with 85,300 tons in 1904, or about 149 per cent increase during the twenty-year period.

South Now Consuming Over Eighty Per Cent of Its Pig Iron

By James A. Green, President The Matthew Addy Company, Cincinnati, Ohio

In the year 1895 Samuel Thomas, president of the Pioneer Iron Company, was host to a large party of American and English ironmasters who met in Birmingham. After an inspection of the furnaces and the mines there was a dinner held at the old Morris Hotel. One of the Englishmen had the gift of eloquence and the bravery of prophecy. He announced that Birmingham presently would displace Sheffield and Pittsburgh, and without any question in the next quarter of a century Birmingham would be the arbiter of iron and steel—that all the quotations the world over would be based on Birmingham. Probably everyone at the dinner believed that the speaker was telling no more than what would be the truth. And when his remarks were a little later read in Pittsburgh and in Sheffield they sent cold shivers down the backs of the ironmasters that belonged in those places. And, indeed, why not? It was costing about $6 to make pig iron in Birmingham and it was confidently believed that the cost could be reduced to $5 by a little more effort. The freight rate to Cincinnati was $2.25 a ton, so that pig iron could be put on the banks of the Ohio River at a cost not to exceed $8.25. It was possible, by way of Pensacola and Mobile, to obtain a freight rate to Liverpool of somewhere between $3 and $4. Southern iron was being shipped in great tonnages to Chicago, to Cleveland, to Buffalo. There was in all America no furnace outside of those in the South that could compete with Birmingham. A little later when the Carnegie Steel Company began to make open-hearth basic steel their initial purchase was 25,000 tons of Birmingham iron, which came to Cincinnati by rail and was then transferred to barges and shipped by the Ohio River to Pittsburgh, and it was delivered at the Carnegie plant for several dollars less than it cost the Carnegie Steel Company to make their own iron. So it looked as if Birmingham "had the world by the tail," and that presently the only iron that would be made in America that was not made and furnished by the Alabama masters would be Bessemer, which they could not make, or some special irons that they did not care to make. At that time probably 99 per cent of all the iron that was made in the South was shipped out of the South and consumed somewhere north of the Ohio River. That this condition would ever radically change no one anticipated. In those days it was taken for granted that Birmingham would continue to ship iron North, East and West and that the export business would constantly increase, and it was furthermore supposed that the present very low cost of producing iron would not change. Those costs were based on exceedingly cheap labor and an abundant supply of raw materials on the surface, or practically on the surface.

Now, all these things which were predicted with such confidence in 1895 have failed to come to pass. Not that the South is any less potent as a producer of iron, but because of economic conditions which it was not possible to foresee. Birmingham is still making iron, but Pittsburgh and Sheffield have ceased to have the cold shivers run down their backs at the mention of its name. They no longer fear that Birmingham is going to put them out

of business by dumping cheap iron in unlimited quantities on them. And Birmingham is no longer fixing pig iron prices for America. The reason for this is that Birmingham as a shipper of pig iron to the East, to the North and to the West has steadily become less and less important. Alabama is now placing most of its iron at home. It is using it near where it was made. Where thirty years ago there were only furnaces employing the men needful to produce the ore and coke and the stone to feed them, there are now in the train of these furnaces, foundries and mills enough to fabricate the iron into finished forms ready for the ultimate consumer, employing, of course, a great army of men in these various processes.

The change is immensely in favor of the South. It used to export all of its raw materials and import all of its finished goods. Now it is changing the very large proportion of its raw materials in the way of iron into finished goods and using them on the spot.

According to a careful calculation made not long ago 86 per cent of all the iron made in the Birmingham district is used at home. The iron that is made at Sheffield, Ala., and in the state of Tennessee for the main part is still shipped North, but year by year the proportion grows greater of this iron which is used at home.

In this connection it is well to note a very great general change in the iron and steel trade which has been taking place with accelerating speed in the past fifteen years, and that is the trade is being more and more localized. Undoubtedly up to the end of the last century the tendency was to centralize the manufacture of iron in America in a few places—Birmingham, Pittsburgh, the Lehigh Valley, Virginia and Hanging Rock, for example. But furnaces have been built at St. Louis, at Chicago, at the Soo, at Duluth, at Detroit, at Cleveland, at Buffalo and at Wheeling, while the existing furnace plants in Pennsylvania have been much enlarged, particularly those of Bethlehem.

There has been such an increase in freight rates that it has been impossible for a furnace company to do a national business. The Birmingham furnaces fifteen and more years ago enjoyed exceedingly low freight rates, with an exceedingly low cost of production, and this combination enabled them to put their iron in every state of the Union. They were national economic factors. But Birmingham is now largely barred out of the markets which it formerly so extensively enjoyed because Alabama, in common with the rest of the country, has had an enormous increase in the cost of production due to the higher cost of labor. In addition its freight rates are practically 100 per cent above what they used to be—as, for example, the rate on pig iron per ton from Birmingham to Cincinnati is now $4.05. Furthermore, Birmingham is no longer able to scrape the surface and find its raw materials. Its mines now, as a rule, are far underground. As for example, the Gulf States Steel Company on Shades Mountain has an inclined plane running down to the red ore which is one of the most monumental and expensive mine entrances in the world. All of which means, of course, a much greater cost in the assembling of raw materials. And if there had been no development of the home market in the South, and the North had developed as it has in the past quarter of a century, the Birmingham furnaces at the present time would be in an extremely critical condition. They would only be able to run in times of exceeding stress, when there was a demand for everything, irrespective of price. As it is, however, the development of a market at home has saved the iron industry of the South, and Alabama and Tennessee are protected from competition in their home market by the fact that no furnace north of the Ohio River could ship South and compete on anything like even terms. Freight rates render that impossible.

The first great iron-consuming plants to be established in the South were those which manufactured water and gas pipe. These proved successful. And today the pipe plants take a larger proportion of Southern iron than any other industry.

The making of soil pipe followed, of course.

The Tennessee Coal, Iron & Railroad Company at one time was the largest producer of merchant pig iron in the country. It now uses practically all of its pig iron for the manufacture of steel. The Gulf States Steel uses its own for its steel, and in times of unusually good business it purchases in the outside market. Birmingham, itself, from being simply a furnace town is full of all kinds of diversified industries relating to iron, machine shops, engine works, stove foundries, general foundries, radiator shops, etc., and Chattanooga is a close second.

Twenty-five years ago the man in Alabama who wanted first-class plumbing fixtures in his house, or who wanted a good heating system, probably went to Cincinnati or Detroit for what he wanted. Now he can find it at home. It was the same with pretty nearly everything else in the line of manufactured goods. This development in the South is really one of the most impressive chapters in American industrial history. As a matter of fact, Alabama is almost the "Yankee State," and the writer means this, not that the New Englanders have captured it, because the Alabamians are Alabamians, but that in the utilization of its opportunities Alabama has repeated the history of New England, and the end is not yet.

One Southern State Produces 94 Per Cent of Country's Bauxite

In 1923 the United States produced 522,690 tons of bauxite, valued at $3,156,610, an increase of 72 per cent in quantity and 56 per cent in value, as compared with the 1922 output, according to reports of the United States Geological Survey. This quantity is more than the largest production of bauxite before the World War.

One plant in Arkansas was the largest producer of bauxite, handling about 1000 tons a day. Three other companies also mine bauxite in Arkansas. In the Arkansas field the production increased from 266,790 tons in 1922 to 493,880 tons in 1923, or about 94 per cent of the country's total production. The production in the Southeastern field declined from 42,810 tons in 1922 to 28,810 tons in 1923. The greatest decrease occurred in the Alabama districts, for the production of both Georgia and Tennessee was greater in 1923 than in 1922.

About eight companies were working deposits in Alabama, Georgia and Tennessee in 1923 and produced 28,810 tons.

In 1889 Georgia produced 728 tons of bauxite. In 1900 production of bauxite had jumped to 23,184 tons in the three Southern states of Georgia, Alabama and Arkansas. By 1905 these three states were producing over 48,000 tons, valued at $240,000. In 1908 the state of Tennessee joined the production column and a total of over 52,000 tons was mined.

In 1910 the South produced 148,932 tons, valued at $716,758.

Imports of bauxite in 1923 were 119,020 tons. Consumption of bauxite in 1923 was 563,150 tons, against 313,639 tons in 1922, the aluminum industry consuming 380,518 tons, compared with 211,550 tons in 1922.

Production and Potentialities of the South's Coal Fields*

By W. T. Thom, Jr., U. S. Geological Survey, Washington, D. C.

No more impressive or significant index of the South's accelerated development is obtainable than that afforded by the record of coal produced in the Southern states. Endowed with great resources of coals suitable for all classes of fuel use, the South has overcome first one and then another of the obstacles which originally restricted the exploitation of its resources, with the result that the output of its coal fields, once almost wholly consumed in local Southern markets, now occupies a vital and, in a sense, a dominant position in the basic economic structure of the country.

W. T. Thom, Jr.

The presence of coal in the vicinity of Richmond was known as early as 1700, and the deposit there was exploited as early as 1775. By 1828 the production from the several coal fields of Virginia (then including West Virginia) had risen to 100,000 tons per year, and by 1860 coal was being mined in Alabama, Georgia, Kentucky, Maryland, Missouri, Tennessee and Virginia (and West Virginia), with an aggregate output for the 5-year period, 1856-1860, of about 8,500,000 tons. In spite of the industrial dislocations accompanying and following the Civil War, Southern coal production increased to 9,500,000 tons in the period 1861-1865, and to 15,500,000 in 1866-1870, and has since continued to gain both actually, and with reference to production in the remainder of the United States, amounting to 198,000,000 tons in 1923. Some idea of the rate of growth of production is obtainable from the accompanying table, which shows the coal output for every tenth year from 1870 to 1920, and from Figure 1, which expresses the data graphically for five-year periods.

Factors in Southern Coal Development

The factors which have contributed to the growth of Southern coal production are numerous and interrelated, and it is impossible to assign absolute values to the influence of different ones. In general it may be said, however, that in the early years following the Civil War the accelerated growth of manufacturing in the South led both to an increased demand for industrial purposes and to growing use of coal as domestic fuel by urban population collecting in industrial centers. Paralleling this change came the growing development of the cement and ceramic industries of the South, the development of Southern blast furnaces and steel mills, and the growth of related heavy industry, which, in turn, led to a rapid expansion in railroad construction, with a correspondingly increased demand for railroad fuel.

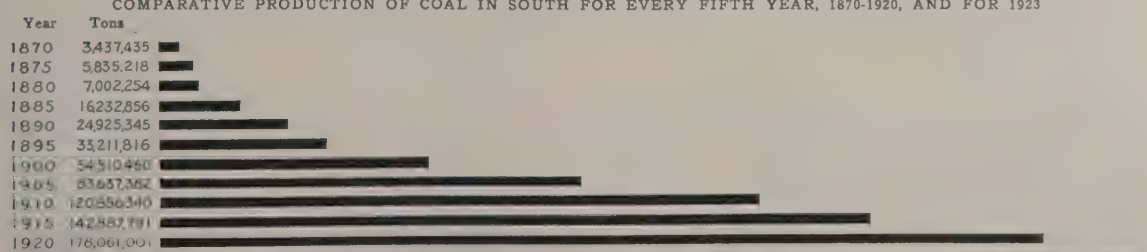
Prior to the construction of the trans-Southern rail

Production of Coal in Southern States and United States for Every Tenth Year, 1870 to 1920, Inclusive
(Tons of 2000 pounds)

	1870	1880	1890	1900	1910	1920
Alabama	11,000	323,972	4,090,409	8,394,275	16,111,462	16,294,099
Arkansas	.....	14,778	399,888	1,447,945	1,905,958	2,103,596
Georgia	15,000	154,644	228,337	315,557	177,245	50,156
Kentucky	150,582	946,288	2,701,496	5,328,964	14,623,319	35,690,762
Maryland	1,819,824	2,228,917	3,357,813	4,024,688	5,217,125	4,065,239
Missouri	621,930	844,304	2,735,221	3,540,103	2,982,433	5,369,565
North Carolina	15,000	350	10,262	17,734	.....	11,540
Oklahoma	.....	120,947	869,229	1,922,298	2,646,226	4,849,288
Tennessee	133,418	495,131	2,169,585	3,509,562	7,121,380	6,662,428
Texas	.....	.....	184,440	968,373	1,892,176	1,615,015
Virginia	61,803	43,079	784,011	2,393,754	6,507,997	11,378,606
West Virginia	608,878	1,829,844	7,394,654	22,647,207	61,671,019	89,970,707
Total	3,437,435	7,002,254	24,925,345	54,510,460	120,856,340	178,061,001
Total for United States	33,035,580	71,481,570	157,770,963	269,684,027	501,596,378	658,264,932

Fig. 1

COMPARATIVE PRODUCTION OF COAL IN SOUTH FOR EVERY FIFTH YEAR, 1870-1920, AND FOR 1923



* Published by permission of the Director, U. S. Geological Survey.

routes and the linking of the Southern rail systems with those of the East and North, the Southern coal fields had been almost wholly isolated from other than local markets, except in so far as the demand for bunker and export coal and for industrial fuel in New England had been met by the movement of Maryland, Virginia and West Virginia coals to tidewater. After the linking up of the rail systems, however, Southern coal began moving northward and westward across the Ohio and into the Northwest via the Great Lakes route. This movement is partly due to the relative excellence of some Southern coals for domestic fuel, and is partly due to the growing demand for Southern coal for use in the by-product coke oven and related operations in the middle West, which have been greatly expanded as a result of the World War. To some extent the general westward industrial shift induced by the war is also reflected in a larger demand for Southern coal for power purposes.

In addition to the suitability of Virginia, West Virginia and eastern Kentucky coals for bunker, export and by-product use, an exceedingly important element in the South's ability to compete for markets beyond its borders flows from the labor situation existing in most Southern coal fields as contrasted with that in the fields to the north and west. Most of the Southern Appalachian coal fields have never been strongly or extensively unionized, and consequently labor costs at mines in these fields have been relatively flexible as compared to those in more closely unionized districts, giving the unorganized fields a margin of competitive advantage in seasons of dull market, and an opportunity for great expansion during a period such as that of the great coal strike of 1922. As Tryon* states, "That these advantages were effective in promoting the growth of the non-union mines at the expense of the union mines may be seen by comparing the relative position of the two groups in 1898 and in 1914. Whereas, during this period, southern Ohio and Pittsburgh declined * * * in relative importance among the fields of the Appalachians competing in Western markets, shipments from northern West Virginia increased, the non-union regions of eastern Kentucky were developed with extraordinary rapidity, and an entire new field—Logan county, West Virginia, coming into first production in 1905—had taken rank as one of the most productive districts of the country by 1914. Twenty years ago the coals of Hocking Valley, Fairmont, Pittsburgh, and eastern Ohio were regularly quoted on the Chicago market. Today, Pittsburgh has entirely disappeared from the Chicago market and the other coals mentioned are represented only by occasional shipments.

"In 1898, 86 per cent of the coal shipped up the Lakes originated in the union districts of Pittsburgh and Ohio. In 1913 their share had dropped to 60 per cent. In 1898, southern West Virginia shipped to the Lakes only 40,000 tons, or less than 1 per cent of the total. In 1913, its contribution ran over 6,000,000 tons, or 23 per cent of the total. Non-union eastern Kentucky first broke into the Lake trade in 1909, with shipments of 7000 tons; since then its share has increased by leaps and bounds, until in 1921 the district supplied 2,600,000 tons."

Kinds of Coal Mined in the South, and Uses

Although there are many who yet think of coals as of two kinds—hard coal (anthracite) and soft coal (all coal not anthracite)—all who are familiar with modern industry realize that there are probably as many kinds of coal as there are of stone, and that many industrial processes require coals of certain special chemical and physical properties, although for other classes of use the price per effective heat unit of the coal at the point of consumption is the principal consideration. These latter classes of uses, prominent among which are railroad, domestic and general steam raising, present demands which are shared by practically all of the developed fields, contrasting with the demands for special-use coals, which are only felt in those fields producing coal of suitable quality.

Railroad Fuel.—Southern railroads afford a market for approximately one-fourth of the South's coal output, and as cost per unit of available heat at point of consumption is the prime consideration in selecting railroad fuel, almost all of the developed Southern fields are drawn upon for the purpose to a considerable extent. As a general proposition, high-volatile coals not so light as to be blown out of the locomotive stack are most suitable for railroad fuel, but such considerations are subordinate to the efficiency of the fuel delivered, per unit of cost, which, in turn, is largely dependent upon the type of locomotive firebox equipment.

Domestic Fuel.—All developed Southern coal fields are drawn upon to some extent for domestic fuel, and coals of even the most inferior character are used as domestic fuel under some circumstances owing to their local cheapness and availability. In general, however, coals sought for domestic use are blocky and clean to handle, burn without making smoke or clinker, and require the minimum of attention while burning.

Anthracite coals are the standard of excellence in domestic fuels, and active interest is now being displayed in the development of the Brushy Mountain semi-anthracite field of Virginia, which contains coal comparable in rank with that produced from some of the beds of the Lykens Valley district in Pennsylvania, which have enjoyed especial popularity on account of their free-burning qualities. In the past, Virginia semi-anthracite has generally been insufficiently cleaned before being marketed, but if the ash content of commercial shipments does not exceed the average of like shipments from the Pennsylvania anthracite fields, markets can undoubtedly be found for a large output. Coal essentially similar to that of the Virginia semi-anthracite field has long been mined in the eastern part of the Arkansas coal field, and is much esteemed as a domestic fuel, being commonly referred to in the trade as Arkansas "anthracite."

By-product coke also possesses in large measure the merits of anthracite as a domestic fuel, and is being well received in many communities as a substitute for anthracite. Among other coals enjoying great reputation as domestic fuels are those of the Jellico district of Kentucky-Tennessee, the block and cannel coals of East Kentucky, the Montevallo coals of Alabama, and the semi-bituminous or "smokeless" coals of the Pocahontas and New River fields.

Steam Raising.—For general steam-raising purposes, as for locomotive use, the comparative cost per unit of effective heat energy delivered to the boiler at point of consumption is the best test of the relative merit of different coals, and even impure and low-rank coals may be the most economical to use near their point of origin because of their relative cheapness and ready availability. Practically all of the productive Southern fields, therefore, serve the steam-trade market to a greater or less degree.

Cement Burning.—Practically all Southern bituminous coals containing up to about 15 per cent of ash may be used for cement making, the slack coal from the mines being ground to pass a 100-mesh sieve before being blown into the furnaces with compressed air. In view of the fact that one ton of coal is required for the production of

* F. G. Tryon, "Effect of Competitive Conditions in Coal Mining," Steam Coal Buyer, February, 1924, p. 43.

10 barrels of cement (3800 pounds), it will be seen that the cement industry of the South affords a great and growing market for Southern coal.

Burning Clay Products.—The burning of brick and of similar clay products requires a high-volatile, non-coking coal which does not yield a troublesome clinker, and for burning the more highly glazed and refractory products coals of high calorific value are needed. For burning all of the finer types of ware, coals having the least possible sulphur content are required. Large quantities of coal originating in Alabama, Kentucky, Oklahoma, Tennessee, Virginia and West Virginia are used by the ceramic industry, and some additional coal is also similarly used in Missouri and Texas.

Bunker and Export Coal.—The low-volatile coals of the Georges Creek, Pocahontas and New River fields are celebrated as bunker coals, and together with high-volatile and special-use coals from Virginia, West Virginia, Kentucky and Alabama have been largely exported. It is quite possible that in the future coal from the Deep River field of North Carolina may also move to tidewater in considerable volume. For steamship use it is essential that fuel should give a high and uniform heat yield per unit of bulk and weight, and smokelessness is also an essential requirement for navy use in time of war. General specifications for export coal are high heating value, low ash and sulphur content, and in special cases particular properties, as, for example, suitability for by-product coke or gas manufacture.

Beehive Coke.—Coal suitable for beehive coke making is being, or has been, produced in Virginia, West Virginia, Kentucky, Tennessee, Georgia, Alabama and Oklahoma. The suitability of a coal for beehive coke making can usually be predicted from a study of the hydrogen-oxygen ration determinable from its analysis, good coking, poor coking and non-coking coals, being, respectively, characterized by ratios of 59 or over, 55 to 59, and under 55. Use under conditions of commercial scale operations is, however, the only absolutely trustworthy test of the coal for coking in beehive ovens. Coals best suited for beehive coke making contain about 32 per cent volatile matter, 7 per cent or less of ash, less than 1½ per cent sulphur and less than .02 per cent phosphorus. Great reserves of coal meeting these specifications yet remain, and the demand for coal for this purpose will be of importance for many years during periods of active demand for iron and steel products. However, the greater percentage yield of coke from coal changed into by-product ovens and the expanding market for the recovered by-products are causing a marked shift from the beehive to the by-product method of coke making.

By-Product Coke.—The excellence of the numerous coals of eastern Kentucky, southern and central West Virginia and southwestern Virginia for use in by-product coke making has been a great factor in increasing coal shipments from these states to Northern and Western markets, and large tonnages of Alabama coal are also charged into the by-product ovens of the Birmingham district.

Unlike beehive coke oven plants, which are located at or near the mines producing the coals coked, by-product coke ovens are situated near the points of consumption of the coke and by-products, and although the most important item of by-product oven output still continues to be metallurgical coke, a number of by-product plants are also operated chiefly as sources either of artificial gas or of domestic fuel, and in times of large demand for distillation by-products may be operated primarily for their production. It follows, therefore, that coals of a wide range of composition may be used by by-product plants, the more so because it is possible to mix suitable proportions of coals of varying composition in order to produce a charge having the desired average constitution. To this practice of mixing the coals of the Middle Appalachians lend themselves with peculiar facility. A standard mix in the by-product plants of the Chicago district is the low-volatile, fast-coking coals of the Pocahontas and New River districts in combination with the high-volatile coals of Logan, Kanawha and eastern Kentucky, which are rich in by-products. Improvements in oven practice have made available for by-product coking large reserves of coal once regarded as unsuited to the purpose, and other technologic advances, such as purification of coal by sand flotation, may add greatly to the potential reserves of coal suitable for coking, and it is likely that in the course of the development of by-product coke making and low-temperature carbonization of coal all of the larger coal fields of the South will be drawn upon in some degree.

Artificial Gas.—To be suitable for the manufacture of artificial gas for domestic use coal must meet essentially the same requirements as for by-product coke making. Considerable tonnages of coal produced in Alabama, Kentucky, Tennessee, Virginia and West Virginia are now used by coal-gas plants, but it is altogether likely that in the future by-product ovens will meet these demands for artificial gas in increasing degree.

Geology and Geography of the Coal Fields

The coal deposits of the South are divisible into four groups, which are, respectively, of Pocono (lower Mississippian), Pennsylvanian, Triassic and early Tertiary (Eocene) age, and of these the Pennsylvanian group is vastly the most important. The Pocono coals include the semi-anthracite deposits of the Meadow Branch or Sleepy Creek field of West Virginia and of the Brushy Mountain or Valley coal field of Virginia. The Pennsylvanian coals are mainly of semi-bituminous and bituminous rank, and are those of the great Appalachian field—of western Kentucky, of Missouri, Arkansas and Oklahoma, and of central and northern Texas. The Triassic coals are principally of high bituminous rank, and are found in the small basins comprising the Richmond, Farmville and Deep River fields of Virginia and North Carolina. Some beds of semi-anthracite coal from a few inches to perhaps a foot thick are also found in rocks of Triassic age on the Dan River in north-central North Carolina. The Eocene coals are principally lignites, and occur in the Gulf Coastal Plain, diminishing in importance from Texas eastward. The effect of metamorphic action accompanying disturbances of the earth's crust in or near coal fields is well illustrated by the Eocene deposits of Texas, for coals of the same age as the lignites of eastern Texas have been thus altered to a bituminous rank in the vicinity of Eagle Pass, on the Southern border; similarly, in the Appalachian region, the easternmost coals, which were most exposed to the thrusting which formed the Appalachian Mountains, are anthracites or semi-anthracites, and the gradual westward decrease in rank, away from the zone of maximum disturbance, is clearly marked.

Geographically, the Southern coal fields include the Gulf Province, as defined by Campbell, and the southern parts of the Interior and Eastern Provinces. That part of the Eastern Province south of the Mason and Dixon line includes the minor Atlantic Coast (Triassic) and Valley (Pocono) coal regions, and the great area of coal land extending from Maryland and West Virginia into Alabama. The Southern coal fields within the Interior Province are also divisible into Eastern Interior, Western Interior and Southwestern regions, which consist, respectively, of the Western Kentucky; Missouri, Arkansas and Oklahoma; and central Texas fields.

Atlantic Coastal Coal Fields

The Richmond field of the Atlantic Coastal region was among the first, if not the first, of the Southern coal fields to be exploited, but mining there was discontinued after a time because of the competition of other fields and because of operating difficulties, including displacements of the coal beds by faults, which were not readily surmounted with the crude equipment and methods then in use. The coal is of high bituminous rank, however, and the field will eventually be an important source of local coal supply. The Farmville field resembles the Richmond in general geologic features, except that the coals present are few and thin, and probably will not be exploited on any large scale for many years. The Dan River field of North Carolina contains outcrops of thin beds of semi-anthracite coal having a maximum observed thickness of a foot, and is, therefore, of no present importance. The Deep River coal field of North Carolina, on the other hand, may become an important source of coal suitable for coking purposes, and estimates contained in a report issued by the North Carolina State Survey credit the field with a reserve of 85,000,000 tons of coal within depths of less than 2000 feet.

Valley Coal Fields

The semi-anthracite coals of the Sleepy Creek and Brushy Mountain fields have been extensively prospected from time to time, but early attempts at development were hampered by lack of transportation facilities and by lack of adequate working capital, with consequent inadequate preparation of the coal marketed. However, recent co-operative studies by the Virginia and Federal Geological Surveys of the Virginia part of the semi-anthracite field apparently indicate that with proper preparation the coal from the Valley field may well prove to be a very acceptable substitute for Pennsylvania anthracite within territories largely determined by railroad freight rates. The rocks of the Valley field have been subjected to great compression, resulting in the production of a number of great thrust faults. In consequence, it may be many years before the precise limits of the field are determined.

Appalachian Coal Fields

Parts of the great Appalachian coal region are contained in Maryland, Virginia, West Virginia, Kentucky, Tennessee, Georgia and Alabama, and within this great stretch of coal-bearing territory are located some of the richest deposits of high-grade fuel in the world. The coal-bearing rocks of major importance in this region belong to the Pottsville, or basal Pennsylvanian, series, which includes all of the coal-bearing formations in the region within and south of the Kanawha field, which lies in central West Virginia. Coal beds belonging to the post-Pottsville, Allegheny, Conemaugh and Monongahela series are present to the north and west of the Kanawha district and contain a number of seams of importance, of which the Pittsburgh bed is the most noted.

Maryland Fields.—The coal-bearing rocks of principal importance in western Maryland belong to the Allegheny, Conemaugh and Monongahela formations and are preserved in five synclines or downfolds of the rocks, which include, respectively, the Georges Creek, Upper Potomac, Castleman, Lower Youghiogheny and Upper Youghiogheny basins. The coals of these fields, notably those of the Georges Creek basin, have long been under development and are celebrated as smithing and steam coals, and have been largely used for bunker and export purposes.

Virginia Fields.—The coal-bearing formations of the major coal area of Virginia are probably all of Pottsville (earliest Pennsylvanian) age, and are principally under development in the Pocahontas, Clinch Valley, Southwestern Virginia and Thacker fields. The Pocahontas field contains semi-bituminous or "low volatile" coal, which is famous for its purity, high heat value and coking qualities. At least 15 coal beds are of workable thickness within the field. The Clinch Valley and Southwestern Virginia fields were opened about 1891 and are now the most productive fields in Virginia, yielding a medium volatile coal of high heat value and low ash and sulphur content, much in demand for coke and gas making, for domestic and bunker fuel and for export. A large number of seams are of workable thickness in the field, affording a great reserve tonnage for future exploitation.

West Virginia Fields.—West Virginia contains a complete sequence of the Pennsylvania coal measures, and in addition some areas containing small quantities of Mississippian and Permian coals. In general, it may be stated that the oldest coal-bearing rocks are exposed in the eastern and southern parts of the state, and the western inclination of the strata causes younger and younger coal beds to be present as the state is crossed northwestward. The Pocahontas, New River and Kanawha subdivisions of the Pottsville series have, as might be imagined, their major outcrop and thickness in the fields of corresponding name, and are overlain successively by the Allegheny, Conemaugh, Monongahela and Dunkard series.

The Pocahontas, New River-Winding Gulf, Kanawha, Fairmont, Logan, Tug River, Kenova-Thacker, Gauley, Coal and Coke, Panhandle, Elk Garden-Upper Potomac, Coal River and Randolph-Barbour fields include most of the principal coal-producing areas of the state, although numerous additional productive areas exist. There are more than 100 named coal beds in West Virginia, of which more than half are thick enough to mine under present conditions. The Pocahontas and New River fields are famous for the purity and high heating value of their coal, which is of semi-bituminous rank, and is widely used for export and bunker shipment, for coke making, steam raising, household and many other purposes. The Kanawha high-volatile coals are excellent for steam raising, for by-product use and for artificial gas making, and the hard and blocky "splint" coals of the field enjoy a great reputation for steam raising and domestic use. The Fairmont field produces high volatile coal used for gas making, export, coke making and steam raising, and is largely used for locomotive fuel. The Elk Garden and Upper Potomac fields, which are essentially continuous with the Georges Creek field of Maryland, are sources of low-volatile coal used for the same general purposes as the Georges Creek coal. The remaining fields of the state produce high volatile coals, of which those from central and southern West Virginia are suitable for by-product coke oven use as well as for general fuel purposes.

Eastern Kentucky.—The coal measures of eastern Kentucky are probably all of Pottsville age, the oldest coals being those nearest the western border of the coal-bearing area. Most of the coals of eastern Kentucky contain very little sulphur, and those of the extreme eastern part of the state are notably low in average sulphur content. According to trade usage, eastern Kentucky is ordinarily divided into the northeastern Kentucky, southeastern Kentucky and Hazard districts, which are, in turn, subdivided into smaller productive fields.

Northeastern Kentucky.—This district, sometimes referred to as the Big Sandy or Elkhorn field, includes the Redwine, Princess, Paintsville and Elkhorn fields, and is the source of great quantities of superior-quality, high-volatile, by-product coal, as well as of domestic fuel and gas coal. A great proportion of its production crosses

the Ohio, and a considerable tonnage from it enters into Great Lake shipments. Although within Kentucky, the mines along Tug River at the northeastern border of the state are ordinarily excluded from the northeastern Kentucky district because of their trade affiliations with the Kenova-Thacker or Williamson field of West Virginia, with which they are ordinarily classified.

Southeastern Kentucky.—The southeastern Kentucky district embraces the Benham, Harlan and Cincinnati Southern fields and parts of the Southern Appalachian and Jellico fields, which also extend into Tennessee. The coals of the district are high-grade, high-volatile bituminous coals similar to and used for the same purposes as those of northeastern Kentucky. Among especially noted coals of the district is the block coal of the Jellico field, which is famous as a domestic fuel.

Hazard Field.—This field includes minor groups of operations in Breathitt and Lee counties, as well as the main Hazard field in Perry county, and its product is in demand for domestic use and for by-product coke and illuminating gas making.

Tennessee Fields.—The coal-bearing rocks of Tennessee are probably all of Pottsville age and are commonly divided geographically into the main Cumberland Plateau field and the northeastern field, which embraces the rugged area northeast of the Plateau. In the Cumberland Plateau field the coal measures are only slightly tilted, but in the northeastern field the simple basin structure of the coal series is locally broken and greatly disturbed by great thrust faults. The principal coal production of the state comes from the northeastern field. The main centers in this district are the Tennessee parts of the Jellico and Southern Appalachian fields, whereas the La Follette, Rockwood, Bon Air and Soddy fields are among the important mining centers of the Plateau field proper. The coal mined in Tennessee is of high volatile content and is used principally for railroad and domestic fuel, and to a lesser degree for coke making.

Alabama Fields.—The Alabama coal fields lie at the southern end of the Appalachian coal region and are remarkable for the great thickness of the Pottsville coal-bearing series within them. In geologic structure these fields somewhat resemble the European coal fields because of the sharply folded and broken condition of the coal measures. Four major fields are recognized in Alabama; the Coosa, Cahaba, and Blount Mountain fields, which occupy long narrow downfolds of the rocks at the eastern margin of the coal-bearing area, and the Warrior River field, which embraces the great sweep of coal-bearing land west and northwest of Birmingham. The Coosa field is about 40 miles long, with an average width of about 8 miles, and contains at least 12 beds of coal 3 feet or more in thickness in about 6000 feet of measures. The Cahaba basin may contain as much as 10,000 feet of coal measures, with several workable coal beds which are extensively mined, largely for domestic fuel. The Cahaba field is much affected by faults and folds, which subdivide it into the Montevallo, Blocton and Henry Ellen districts. The Blount Mountain field is smaller than the Coosa and Cahaba, and contains more than 30 coal beds, about one-half of which are of workable thickness. The Warrior field contains more than half of the coal-bearing area of the state, and contains a number of seams of coking coal, both coal beds and containing measures apparently showing a regional thinning toward the west.

Eastern Interior Field

Western Kentucky—The western Kentucky coal field is geologically part of the same unit as the fields of southern Indiana and Illinois, resembling these latter fields in the general composition and mode of occurrence of its coals, which are high in volatile content and are largely used for domestic purposes, steam raising and locomotive fuel. About three-fourths of the output of the field comes from the No. 9 bed, although several others are worked in various parts of the field.

Western Interior Field

Missouri Field.—The coals of Missouri are of Pennsylvanian age, and owing to the northward and westward slope of the rocks away from the Ozark uplift the oldest coal exposed is that nearest the southeastern margin of the coal field. The Bevier coal, which occurs near the base of the coal measures, is the source of a large part of the state's output, and about a dozen other beds are mined more or less extensively within the state, practically all of the coal produced being consumed locally. In addition to the bituminous coals of the main field, Missouri also contains a number of very small, though thick, deposits of cannel coal, which have been the objectives of numerous small-scale mining operations.

Oklahoma Fields.—The coal-bearing area of Oklahoma is continuous with that of Missouri and Arkansas, and is subdivided into the Cherokee and Choctaw fields, which include, respectively, the Tulsa and Henryetta, and the McAlester, Lehigh, Wilburton, McCurtain, Poteau and Howe fields. Some half-dozen coal seams are of workable thickness in these districts, the Hartshorne beds being of major importance. The coal of the state is mainly of bituminous rank, but changes eastward into low volatile and semi-bituminous rank coal near the Arkansas state line.

Arkansas Fields.—The major coal field of Arkansas is that of the Fort Smith syncline, within which are located the Spadra, Paris, Denning-Coal Hill, Jenny Lind, Bates-Coaldale and Greenwood-Huntington mining areas. The coal of the Fort Smith region is of semi-bituminous rank near the Oklahoma line and merges eastward into semi-anthracite, which has a wide sale for domestic use under the trade name of Arkansas "anthracite." Although an important proportion of the coal produced in Arkansas is sold for domestic use, the great bulk of it is used as railroad fuel.

Southwestern Field

The southwestern interior field embraces the area of Pennsylvania coal measures in central and northern Texas. Present developments are principally concentrated on the lowest, or No. 1, coal bed, mined at Strawn, Thurber, Rock Creek and Bridgeport, and the overlying No. 7 bed is mined to some extent in each of the eight counties in which it occurs. The coal of the field is of bituminous rank and is sold principally for railroad and domestic use.

Gulf Province

The Gulf Province includes the subordinate bituminous coal fields around Laredo and Eagle Pass in southwest Texas, and the great sweep of lignite-bearing land which extends around the margin of the old Gulf Embayment from Texas into Alabama. The lignites of the Gulf Province are as yet relatively of slight commercial importance, and are being mined on a large scale only in Texas owing to the competition of higher-rank coals from the bituminous fields of Alabama, Kentucky, Missouri and Arkansas. Because of this fact, and because the lignite-bearing formations are in many places concealed beneath a mantle of younger deposits, very little information has been collected as to the location and extent of actually valuable lignite deposits, and in the estimates of Southern coal-land areas no figure has been included for lignite-bearing

territory, although the figure of coal-land area would be greatly increased were it possible to prepare such an estimate for the Gulf Province. Similarly, data upon which to base even a rough estimate of the tonnage reserves of Southern lignite are available only for Texas and Arkansas, and no figures are given for possible lignite reserves in Louisiana, southeastern Missouri, western Kentucky, Tennessee, Mississippi and southern Alabama, although it is possible that important lignite reserves exist in the states mentioned.

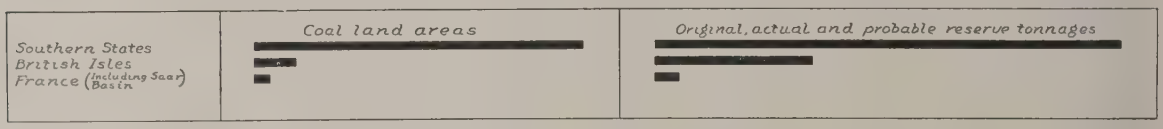
Considerable areas containing coals of low bituminous rank are present near the southwestern end of the Gulf Province, in the Eagle Pass and Laredo fields adjacent to the Rio Grande. The Laredo, or Santo Tomas, field is

COAL LAND AREAS AND ACTUAL AND PROBABLE ORIGINAL COAL RESERVES OF SOUTHERN STATES AND OF BRITISH ISLES AND FRANCE

	Coal land areas (square miles)	Actual and probable coal reserves: Lignite and sub bituminous coal	Actual and probable coal reserves: Bituminous; semi-bituminous, semi-anthracite and anthracite coal (Tons of 2000 lbs.)	Actual and probable coal reserves: Total coal
Alabama	8,500*	0	67,500,000,000	67,500,000,000
Arkansas	1,700	90,000,000	1,800,000,000	1,890,000,000
Georgia	170	0	925,000,000	925,000,000
Kentucky	16,000*	*	123,000,000,000	123,000,000,000*
Maryland	510	0	8,000,000,000	8,000,000,000
Missouri	23,000*	*	84,000,000,000	84,000,000,000*
North Carolina	800	0	200,000,000	200,000,000
Oklahoma	15,000	0	55,000,000,000	55,000,000,000
Tennessee	4,400*	*	25,500,000,000	25,500,000,000*
Texas	11,000†	23,000,000,000	8,000,000,000	31,000,000,000
Virginia	2,120	0	22,000,000,000	22,000,000,000
West Virginia	17,300	0	152,500,000,000	152,500,000,000
Total	100,500*†	23,090,000,000*	548,425,000,000	571,515,000,000*
British Isles	12,000	..	189,533,000,000	189,533,000,000
France (including Saar basin)	3,500	1,600,000,000	33,400,000,000	35,000,000,000

* No estimate is available as to the area or reserve tonnage of lignite-bearing lands in Alabama, Tennessee, Kentucky, Missouri and Louisiana.
† Does not include area of lignite-bearing land in Texas.

COMPARATIVE COAL LAND AREAS, AND ESTIMATED ORIGINAL, ACTUAL AND PROBABLE RESERVES OF THE SOUTH, AND OF THE BRITISH ISLES AND FRANCE



COAL PRODUCTION IN SOUTHERN STATES, WHOLE UNITED STATES, BRITISH ISLES, FRANCE, GERMANY AND ALL EUROPE, FOR EVERY TENTH YEAR, 1870-1920, INCLUSIVE

(Tons of 2000 pounds)

	1870	1880	1890	1900	1910	1920
Southern States	3,500,000	7,000,000	24,900,000	53,750,000	120,850,000	178,000,000
All United States	33,000,000	71,500,000	157,750,000	270,000,000	501,600,000	658,250,000
British Isles	125,000,000	170,000,000	195,000,000	255,000,000	295,000,000	260,000,000
France	15,000,000	22,000,000	29,000,000	38,000,000	43,000,000	28,000,000
Germany	39,000,000	66,000,000	100,000,000	168,000,000	248,000,000	280,000,000
All Europe	205,000,000	295,000,000	400,000,000	550,000,000	690,000,000	675,000,000

COMPARISON OF TONNAGES OF COAL PRODUCED IN SOUTH, WHOLE UNITED STATES, AND IN EUROPE DURING 1880, 1900 AND 1920

principally of interest because it contains the largest known reserve of cannelloid coal in the United States, and both it and the Eagle Pass field are sources of some coal used for railroad, steam and domestic fuel.

The Future Trend of Industrial and Mining Development in the South

The prediction of the future course of industrial and mining development is much more important than the cataloging of part performances or the description of geographical relationships, consequently the foregoing pages are intended to illustrate the diverse character and excellence of many southern coals and to point out that the range of their composition is sufficient to enable them to meet the varied needs of modern industry, and the tables on the preceding page point out the adequacy of the South's coal reserves to support great future expansion in Southern coal mining and a corresponding increase in Southern industries. This is perhaps best done by presenting a concrete comparison of Southern coal resources with those of a great industrial nation like England, and the tables and diagrams given show the comparative coal-land areas and estimated actual and probable coal reserves of the Southern states and of the British Isles and of France, and also show for certain years the annual coal production of the Southern states compared with the production of the United States, British Isles, France, Germany and all Europe.

Although the course of Southern mining and industrial development may differ in many respects from that which nations like England and Germany have followed, it remains nevertheless true that the industrial greatness of both England and Germany is founded upon coal, and that the ratio between their present industrial development and the future development of the South will correspond in a degree to the ratio between Southern and British or German coal resources. The resemblance between Southern and British industrial growth should be the more striking because of the close geographic proximity of Southern coal deposits to the great Southern resources of iron ore and of the other raw mineral materials required for modern industrial processes.

South Producing One-Third of World's Petroleum

By Geo. R. Hopkins, Petroleum Economist, Bureau of Mines, Washington, D. C.

No industry in the United States is more important than the petroleum industry. Without petroleum the wheels of industry would stop, for no suitable substitute for petroleum lubricants has yet been discovered. Automobiles would become almost valueless.

The industry has grown by leaps and bounds. The first well was drilled in August, 1859, by Drake at Titusville, Pa. The production of crude oil in that year was about 2000 barrels. On the other hand, during 1923 there were produced in the United States 732,407,000 barrels of crude oil. This great increase has taken place in only 65 years—some industries take that long to get under way. In 1859 petroleum was not considered of much value; today the petroleum industry ranks second only to the meat-packing industry in the value of its products.

George R. Hopkins

The Southern states have played no small part in this growth. The oil fields of Oklahoma, Texas, Louisiana and Arkansas are the backbone of crude production in this country.

The Southern states were forty years behind the Eastern states in production. This time handicap has been overcome by greater production per well.

In petroleum transportation and manufacture the Southern states have been fortunate. Pennsylvania did not discover pipe lines and refineries with its oil in 1859. The first successful pipe line was not put in operation until 1865. Refineries and refining methods were established even slower. On the other hand, the Southern states, entering the industry actively in 1900, had the benefit of years of experience. Many of the pioneers in the Southern fields were from the Appalachian fields.

Production

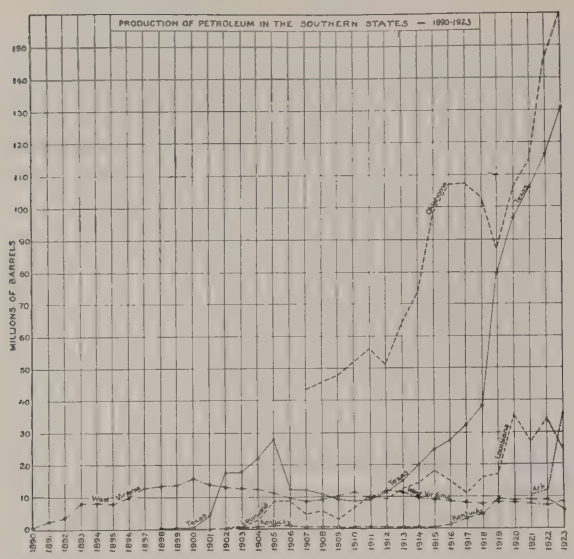
From 1859 to 1875 practically all the oil produced in the United States came from Pennsylvania. The center of production then began to move west and south. West Virginia entered the production column in 1876, Kentucky and Tennessee soon after. Texas became an active producer in 1897, Oklahoma in 1900 and Louisiana in 1902. These three states were similar in that they were opened up at about the same time and in each case increased rapidly in production. In Arkansas the discovery of the El Dorado field in 1921 brought that state into the list of oil producers, and its output of over 10,000,000 barrels gave it the distinction of having produced more oil during its first year than any other state.

Petroleum Statistics for 1923

Production	(barrels)	Approximate number wells December, 31, 1923	Production per well per day (barrels)
Arkansas	36,610,000	1,970	46.0
Kentucky	8,069,000	11,700	1.7
Louisiana	24,919,000	3,630	15.8
Oklahoma	160,929,000	57,500	6.9
Tennessee	8,000	*100	....
Texas	131,023,000	18,250	19.3
West Virginia..	6,358,000	20,100	.8
Total.....	367,916,000	113,250	
U. S. total.....	732,407,000		

*Estimated.

During 1923 the seven Southern states of Oklahoma, Texas, Arkansas, Louisiana, Kentucky, West Virginia and Tennessee produced 367,916,000 barrels of crude oil. The total production for 1923 in the United States



was 732,407,000 barrels. Thus the oil fields of the South accounted for over half of the total oil produced last year in this country. The United States produced two-thirds of the world's oil in 1923; hence the production of the states mentioned represented one-third of the world's total.

The history of production in these Southern states has not been the same. The oil fields of West Virginia, Kentucky and Tennessee are similar to those of Pennsylvania. Most of the wells of these states are of small initial production. However, they produce oil of high grade, are shallow in depth and of long life.

In contrast, the history of production in the four states of Oklahoma, Texas, Arkansas and Louisiana has been marked by the discovery of "gusher" fields.

On January 10, 1901, the discovery well of the Spindletop field came in at 100,000 barrels per day. This well was 1150 feet deep, cost around $5000 and opened up a territory which up to the present time has produced about half a billion barrels of oil. Texas has maintained her position near the top of the oil-producing states by the discovery in recent years of such fields as Ranger, Burkburnett, Mexia and Powell.

In Oklahoma the Glenn Pool, near Sapulpa, was opened up in 1905. This discovery immediately placed Oklahoma in the front rank of the producing states. The Glenn pool was followed by the discovery of the Cushing field in 1912, the Healdton field in 1913, and more recently by such fields as Burbank and Tonkawa.

Louisiana, receiving an impetus from Spindletop, became an active producer soon after Texas. Its production has been increased of late by the discovery of the Bull Bayou, Homer and Haynesville fields in the northern part of the state.

Arkansas did not become an active producer until January, 1921, at which time the El Dorado field was opened up. It has maintained its production by the recent discovery of the Smackover field.

Transportation

The first problem of the oil producer was that of storage, and second that of transportation. The first was easily solved, so that today thousands of storage tanks, capable of holding millions of barrels of oil, have been erected at the producing properties, at tank farms and at the refineries.

As previously mentioned, it was six years after the drilling of the first well before the first successful pipe line was built. Today there are in the Southern states over 20,000 miles of trunk lines and nearly 25,000 miles of gathering lines.

The oil produced in Tennessee, Kentucky and West Virginia is transported by a pipe-line system to Pennsylvania. Oil to be transported from the four states of Oklahoma, Texas, Louisiana and Arkansas is taken care of by trunk lines through Missouri to the East Coast and by lines to the Gulf of Mexico. An example of the former is the Prairie Oil & Gas Co. line from Oklahoma to Indiana to the Atlantic seaboard. An example of the latter is the Texas Company line from northern Oklahoma to Port Arthur. Thus the oil of the Southern producing states can be moved either north or south, dependent on industrial conditions. Of late the movement has been increasing toward the Gulf Coast refineries; that is, to the nearest water routes.

The Southern Refineries

After transportation comes refining.

The refineries of the Southern states fall naturally into two classes: those in the interior, and those situated on the coast, either the Gulf of Mexico or the Atlantic seaboard.

The plants of the latter class are, as a rule, the larger and better equipped, due to the development of shipping facilities and pipe-line connections with the inland fields. Foreign as well as domestic oil is refined in these and the products are shipped far and near. Prominent in this class are the refineries located at the ports of Baltimore, Charleston, New Orleans, Baton Rouge, Port Arthur and other Gulf Coast ports. The following table shows the importance of this group, the larger plant only being included:

Some Large Southern Refineries

Location	Company	Capacity, Barrels
Baltimore, Md.	Standard Oil Co. of N. J.	32,000
	Prudential Oil Corp.	6,000
	U. S. Asphalt Co.	5,000
	Interocean Oil Co.	1,200
Brunswick, Ga.	Atlantic Refining Co.	4,500
Charleston, S. C.	Standard Oil Co. of N. J.	10,000
Good Hope, La.	Gulf Coast Refining Co.	10,000
New Orleans, La.	Liberty Oil Co.	1,100
	Mexican Petroleum Corp.	25,000
	Sinclair Refining Co.	6,000
	New Orleans Refining Co.	20,000
Baton Rouge, La.	Standard Oil Co. of La.	60,000
Port Arthur, Tex.	Gulf Refining Co.	102,000
	Texas Co.	45,000
Port Neches, Tex.	Texas Co.	20,000
Pasadena, Tex.	Crown Oil & Refining Co.	3,000
Harrisburg, Tex.	Deepwater Refining Co.	2,500
Bryanmound, Tex.	Freeport Asphalt Co.	9,000
Galena, Tex.	Galena-Signal Oil Co.	10,000
Baytown, Tex.	Humble Oil & Refining Co.	20,000
Beaumont, Tex.	Magnolia Petroleum Co.	40,000
Magpetco, Tex.	Magnolia Petroleum Co.	1,500
Texas City, Tex.	Pierce Petroleum Corp.	7,500
Smith's Bluff, Tex.	Pure Oil Co.	10,000
Sinco, Tex.	Sinclair Refining Co.	16,000
Total		467,300

The petroleum industry of the Southern states, unlike the cotton industry, did not leave the manufacturing end of its business to the North. It has equipped itself to

refine the larger part of its crude oil plus considerable quantities imported from Mexico and California.

There are close to 300 crude-oil refineries in the sixteen Southern states of a crude-oil capacity of 1,200,000 barrels per day. Three-fifths of these plants, of capacity 875,000, are operating, running to stills (July, 1924), a daily average of 700,000 barrels of crude oil, or at 80 per cent of their capacity.

The refinery of the Standard Oil Co. of Louisiana, a subsidiary of the Standard Oil Co. of New Jersey, is a good example to illustrate the organization of these Southern coastal refineries. This plant was capitalized by 100,000 shares of stock at $100 a share, all issued. It has loading piers of 26,000 barrels daily capacity on a water frontage of seven and a half miles. It has 6,000,000 barrels steel storage, a 100-car loading rack, a barreling plant, operates 4 natural-gasoline plants and owns over 1000 miles of trunk and gathering lines of almost 100,000 barrels daily capacity. It operates a large fleet of tankers. It has holdings of 150,000 acres and a daily crude oil production of about 20,000 barrels.

Although skimming plants, producing gasoline, kerosene and gas and fuel oils, predominate, there are some plants of all types in the South.

The plant of the Texas Company at Ardis, La., near Shreveport, is a "topping" plant. Here the lighter constituents of the crude oil are taken off and the residue, unfinished stock, is sent elsewhere for further refining.

The plant of the Sinclair Refining Co. at Meraux, La., is an asphalt plant. This plant uses mainly Mexican crude, which is of an asphaltic base, and produces distillates, gas and fuel oils and asphalt.

The plant of the Pure Oil Co. at Cabin Creek, W. Va., is a wax plant. It operates on a crude oil of a paraffin base, and specializes in the manufacture of paraffin wax.

The plant of the Misko Refineries, Inc., at Laredo, Texas, is a "lube" plant. It uses crude oil from the nearby Mirando field. This crude is low in gasoline content but high in the percentage of lubricants.

The 100,000-barrel plant of the Gulf Refining Co. at Port Arthur, Texas, is a complete plant, capable of operating on domestic or Mexican crude. It produces all the common petroleum products, which are gasoline, kerosene, gas oil, fuel oil, lubricants, paraffin wax, petroleum coke, or asphalt, or coke and asphalt. Other products of lesser importance produced by a plant of this type are road oil, flux oil, petrolatum, paint products, tar, pitch, acid oil, etc.

These do not exhaust the list of types of refinery plants found in the Southern states. Some plants use combined processes. Thus there are skimming and lubricating plants, skimming and asphalt plants, skimming and coke plants, and combinations of these three.

As an illustration of the way in which the refineries of the South have kept pace with production and industrial demands, take the new plant of the Pure Oil Co. at Smith's Bluff, Texas.

The location of this plant is ideal. Smith's Bluff is one of the Sabine ports of the Gulf of Mexico. It lies 10 miles south of Beaumont and about 25 miles in from the Gulf on the Neches River, an excellent waterway. Vessels of a draft of over twenty feet may load at Smith's Bluff, and the United States Government is now deepening the river to 30 feet.

This refinery receives its crude oil from the Mexia, Curri and Powell fields through an 8-inch pipe line, 220 miles long. The Pure Oil Co. has acquired large producing properties in these fields.

AIRPLANE VIEW OF A REFINERY OF THE TEXAS COMPANY

The present capacity of the plant is 10,000 barrels per day. It is so planned as to permit the addition of further units without disturbing operations. The various buildings of the plant are laid out over an area of approximately 800 acres, extending 2 miles back from the river.

The buildings of this plant are of uniform and substantial construction. They are built of red paving brick and have roofs of asbestos. Iron and steel have replaced wood wherever possible to eliminate the fire hazard.

The railways of the plant are company-built and company-owned. They connect with the Kansas City Southern Railroad. The loading racks are of reinforced concrete construction and have a capacity of fifty cars, the piping to them being so arranged as to include all the products of the plant.

Complete high-pressure fire-prevention apparatus has been installed.

The operating units of the plant are as follows: Three 5000-barrel Foster tube stills, each connected through a separating tower with the condensers; eight 12-foot by 6-inch by 37-inch shell stills; five 1000-barrel agitators and 26 Cross cracking units.

ished stocks, imported from other districts, were run to these refineries.

From these runs billions of gallons of finished products were turned out, the most important ones being listed as follows:

SOUTHERN STATES REFINERY OUTPUT—1923

Product	Output (gallons)	Per cent recovery*
Gasoline	3,000,000,000	33.00
Kerosene	1,000,000,000	11.00
Gas and Fuel Oil	4,000,000,000	44.00
Lubricants	400,000,000	4.00
Wax	25,000,000	0.25
Coke	50,000,000	0.50
Asphalt	250,000,000	2.50
Other finished products	50,000,000	0.50
Losses	300,000,000	3.00
Total	9,075,000,000	

* Only approximate, since no record is made of unfinished runs.

The above recovery percentage figure for gasoline indicates the influence of present-day cracking methods.

VIEW OF PART OF THE PLANT OF THE GULF REFINING COMPANY, PORT ARTHUR, TEXAS, SAID TO BE LARGEST IN WORLD

The crude oil is heated to around 800 degrees Fahrenheit in the Foster stills. About 85 per cent of the charge is vaporized and passes to the condensers through the separators. The heaviest fraction, fuel oil, is drawn off at the bottom of the latter. The vapors remaining condense to benzine, light distillate and gas oil in the condensers. The light distillate and gas oil are then cracked in the Cross cracking units and form fuel oil and more benzine. This benzine is combined with that from the tube stills, treated, sweetened and so on, to standard specification gasoline. Some coke is formed in these operations.

The transferring and loading of the crude oil and the finished products is taken care of by a central pumphouse, with pumps for every service demanded. The larger pumps are operated by electricity, a more uniform speed graduation being obtained than with steam pumps.

Refinery Output

The refineries of the Southern states ran to stills in 1923 between 200,000,000 and 225,000,000 barrels of both domestic and foreign crude oil, or an average of about 600,000 barrels per day. In addition several millions of barrels of both natural-gas gasoline and unfin-

Formerly 25 per cent was used for this figure. Furthermore, recent production figures indicate that 40 per cent is more nearly correct, and it is thought by some that with high quality Oklahoma crude a 70 per cent gasoline recovery will be obtained in the future.

Consumption

This enormous output of petroleum products is disposed of in various ways. Some of it is exported to foreign countries by way of the Gulf Coast ports. A large part of it finds its way to the cities on our Atlantic seaboard and becomes a part of foreign and domestic consignments. The remainder is consumed by the Southern states themselves.

The registration of cars and trucks on January 1, 1924, in the sixteen Southern states was 3,580,473.

Although the total registration for these 16 states is less than one-third of the 48, it is noteworthy that the percentage gains in registration from January, 1922, to January, 1923, have been high, and that, with the exception of Rhode Island, six of the Southern states head the list in this respect. They were the states of Alabama, West Virginia, Florida, North Carolina, Louisiana and Mississippi.

MOTOR CAR REGISTRATION, JANUARY 1, 1924

State	Number of cars	State gasoline tax as of August, 1924 (cents)	Per cent gain in registration 1922-1923
Texas	688,899	1	30.9
Missouri	450,800	0	14.7
Oklahoma	307,000	2.5	23.0
North Carolina	247,700	3	35.6
Virginia	217,200	3	28.5
Maryland	206,450	2	24.7
Kentucky	196,110	3	27.3
Georgia	173,794	3	19.4
Tennessee	165,000	2	21.5
Florida	160,000	3	38.2
West Virginia	157,926	2	40.1
Louisiana	138,500	2	35.6
South Carolina	128,656	3	34.0
Alabama	126,642	2	40.6
Arkansas	111,946	4	29.6
Mississippi	103,850	3	34.6
Total	3,580,473		

As the automobiles of the South are increasing, so is the consumption of gasoline. It is estimated that for the year July, 1924, to June, 1922, the states enumerated above consumed over a billion gallons of gasoline. This figure does not take into account gasoline consumed by tractors, gas engines and other agencies.

There are very little data on the consumption of kerosene and gas and fuel oils in the South, but it is safe to say that the consumption of these petroleum products is increasing. Factories are rising almost daily in the South, requiring an ever-increasing supply of lubricants.

The people of the Southern states are joining the good-roads movement. All the 16 states, with the exception of Missouri, have adopted a gasoline tax. Considerable of the revenue derived from this source is being used to improve the present roads and to build new ones. From the viewpoint of road building, the South is fortunate in being near the Mexican oil fields, where crude rich in asphalt is obtained.

The presence of vast petroleum supplies in the formations underlying the Southern states could be called a stroke of fortune. Natural agencies formed them ages before the South was settled. Their development, however, could not be and was not left to Nature. The Southern states themselves have developed them. This development has been phenomenal in speed and efficiency.

PETROLEUM RESERVES

No article on petroleum is complete without a word as to reserves. In this country petroleum is a rapidly wasting asset, and an occasional appraisal is a business procedure to safeguard our future prosperity.

In March, 1921, the Director of the United States Geological Survey requested the American Association of Petroleum Geologists to co-operate in the preparation of estimates of the oil remaining in the ground and recoverable by current methods. Government geologists and company geologists and engineers worked both independently and through sub-committees. The resulting data, reviewed and revised, are given in the accompanying table which shows the estimated oil reserves of the country by states and regions.

Valuable as these figures are, their speculative nature and the chances for error should be fully recognized. Improved methods of recovery and widespread wildcating are factors which have tended to increase these estimates and to refute the opinions of those who believe that our petroleum resources will be exhausted in 15 or 20 years.

ESTIMATED OIL RESERVES OF THE UNITED STATES, BY STATES OR REGIONS, JANUARY 1, 1922,

(Barrels of 42 gallons)

State or Region	Barrels
New York	100,000,000
Pennsylvania	260,000,000
West Virginia	200,000,000
Ohio	190,000,000
Indiana and Michigan	70,000,000
Illinois	440,000,000
Kentucky, Tennessee, northern Alabama and northeastern Mississippi	175,000,000
Missouri, Iowa, North Dakota, Wisconsin and Minnesota	40,000,000
Kansas	425,000,000
Oklahoma	1,340,000,000
Northern Louisiana and Arkansas	525,000,000
Texas, except Gulf Coast	670,000,000
Gulf Coast, Texas and Louisiana	2,100,000,000
Colorado, New Mexico and Arizona	50,000,000
Wyoming	525,000,000
Montana, Nebraska and South Dakota	100,000,000
Utah, Nevada, Oregon, Washington and Idaho	80,000,000
California	1,850,000,000
Eastern Gulf Coastal plain and Atlantic Coast states	10,000,000
Total	9,150,000,000

By allowing 10,000,000 barrels to Missouri, the states of the South had on January 1, 1922, petroleum reserves of 5,020,000,000 barrels, or 55 per cent of the total for the country. Thus it would appear that the Southern states will be petroleum producers for a good many years.

NOTE.—Crude-oil production figures obtained from publications of the United States Geological Survey; refiner production figures from publications of the Bureau of Mines; automobile figures from automotive industries.

South Produces 92 Per Cent of the Country's Fuller's Earth

The South continues to produce the greater part of the country's output of fuller's earth. Florida was the leading state in output and value in 1923, as it has been from the beginning of the industry. Georgia was second and Texas was third in output and value. These three states reported about 92 per cent of the country's output and value in 1923. The producing states in the order of their output were Florida, Georgia, Texas, Illinois, Massachusetts and Alabama.

The largest output on record of fuller's earth was reported for 1923 by the Geological Survey working in co-operation with the state surveys in Alabama, Florida, Georgia and Illinois. Fifteen operators in six states reported that 149,134 short tons of fuller's earth were sold in 1923, valued at $2,247,523, or an average of $15.07 a ton. This output is 7 per cent greater than that of 1922 and it is nearly four times the output of 1913. The value of the output for 1923 was the third largest that has ever been recorded, and was exceeded only by that of 1920 and 1922. It was six times as large as that of 1913. Imports in 1923 of 8547 tons were the lowest in 25 years.

Paper-Making Progress and Potentialities of the South

By Richard Woods Edmonds, New York

Twenty years ago the use of Southern timber for paper making was prophesied and was even being tried out on a small scale, but many obstacles stood between the prophecy and its fulfilment. For several reasons the rapidly expanding American pulp and paper industry continued to concentrate in the Northeast. Spruce, the principal raw material, was abundant there. Power and clean water were available in sufficient quantities. The largest markets were near by. And as the industry became better established a supply of trained paper-mill labor became available.

Richard Woods Edmonds

Today the obstacles that once stood in the way of the large-scale manufacture of certain paper products in the South from Southern woods have been overcome, and the situation is so completely reversed that the South now offers as great, if not greater, advantages than any other part of the country.

The natural result of this tilting of the economic landscape is a diversion of the inflowing streams of the industry from the great pool accumulated in the Northeast to new territory in the South. In the Northern and Eastern states today no new mills are being built, and the capacity of existing mills is being increased little, if at all. On the other hand, many new mills are being built in the South, and existing mills are greatly enlarging their capacity. The year 1923 saw 19 new mills brought into operation in the South, while some of the older ones doubled their capacity.

No small factors can account for so pronounced a movement in an industry of some 730 establishments, employing more than 100,000 wage-earners and paying annually more than $127,000,000 in wages. The forces that are at work are fundamental and conclusive.

The forests of the Northeast, on which a large part of the industry depended, are nearly exhausted. The total forest resources of Canada are very large, but the greater part of those remaining are still inaccessible. Each succeeding year sees the cutting edge recede farther from centers of manufacture and from transportation facilities, and economically operable stands are already seriously depleted. Nevertheless, the Canadian paper industry continues to expand, and even if Canada withholds her proposed embargo on pulpwood, while maintaining her export duty, local competition and freight rates are likely to make Canadian pulp and pulpwood more costly year by year. In our own Northwest we still have very large stands of timber from which paper might be made, either as an independent product or as a by-product of lumbering. But the freight charges to Southern, Eastern and Northern markets, either by rail or by water through the Panama Canal, will constitute a serious handicap in these markets unless the South should be unbelievably backward in developing her natural advantages. The paper industry, therefore, along with the lumber industry, is facing the possibility of a continental shortage of lumber; indeed, an absolute certainly of it, sooner or later, unless vigorous measures are taken to prevent it.

In paper making, as in other manufactures, an adequate source of raw material is a prime requisite, but in paper making, more than in many other manufactures, a perpetual, nearby source is important because of the weight and bulk of the raw material used and the large investment represented in even a small mill. In other words, the pulp and paper mills cannot well afford to draw their supplies from any great distance, as can manufacturers using materials less bulky in proportion to their value. Neither can they afford to move after their sources of raw materials, as can sawmills, for instance, which represent comparatively small investments. The smallest economical unit of a chemical pulp and paper mill has a daily capacity of about 50 tons. Such a mill usually represents a total investment of at least $2,500,000 when provision for a timber supply is included.

A second prime consideration of paper making is proximity to markets, because the product likewise is large and heavy per unit of value.

No other part of the continent can compete with the South as a source of adequate, perpetual supply of pulpwood. Not only has the South large stands of timber suitable for paper making, but, what is vastly more important in this day of an impending national timber shortage, it will grow trees on cut-over land from three to four times as fast as will the Northeast. This is the overmastering consideration in fixing the South as the future center of the nation's paper industry.

Canadian spruce will grow to pulpwood size in from 60 to 80 years. Southern long leaf, slash and loblolly pines grow to pulpwood size in from 15 to 20 years, and the gums of the bottom lands grow slightly faster than the pines. In fact, one Southern lumber company planning to go into the paper business made a study of the yields of their lands and found that 125,000 acres, operated on the sustained-yield plan, would give them an adequate, perpetual supply of pulpwood. The same mill in the North would require at least 500,000 acres. But spruce will not regrow indirectly and naturally on cut-over land, and spruce is the principal pulpwood of the North. Following the cutting or burning over of a spruce forest comes a growth of blackberries or fireweed. Gradually, then, comes a growth of deciduous trees, usually birch and poplar. Upon the maturity of the deciduous trees, and in their shade, comes pine, which eventually overtops and kills off the deciduous trees. Finally, in the year-round shade of the pines the spruce from surrounding spruce stands gradually reseeds, grows up, and finally kills off the fostering pines as they did the others. The cycle requires anywhere from 200 to 300 years, and if the birch and poplar or the pines are to used, the spruce will never reseed.

Contrast this with the cycle of the chief Southern woods. Given a stretch of cut-over land in the South, with a few pines or a single pine on it for seed, and the whole area will reseed itself with such rapidity that, if the young trees are protected from fires and hogs, a good stand of pulpwood will be ready for cutting in 15 to 20 years. In about

thirty years at most they reach the peak of the annual new growth or yield; the most economical time for cutting.

In the Southern states there are over 200,000,000 acres of producing forest lands, and over 35,000,000 acres devastated by forest fires and lumbering and now lying idle that could readily be brought into production. It is difficult to estimate the yield that could annually be cut from these forest areas under scientific management, and such an estimate would include species not especially well suited for pulping. However, the United States Department of Agriculture, in its Bulletin No. 1241, "How the United States Can Meet Its Present and Future Pulpwood Requirements," published July, 1924, gives an estimate of the yield of suitable pulp species that might be harvested annually, which is more to the point. Under present forest methods, which are no methods principally, the annual growth of suitable pulp species is estimated as 20,690,000 cords. Under intensive forestry methods, it is estimated, this could be increased to an annual yield of 92,160,000 cords. At first thought this possible annual yield of 92,160,000 cords of pulpwood species makes our total pulp requirements of 9,148,000 cords look rather small. However, it must be remembered, first, that intensive forestry methods are being applied to only a very small proportion of the total forest area and cannot be brought to bear upon the whole for many years to come, while the total drain, including the unchecked fires, is about five times as great as the regrowth; and second, that saw timber pays a much larger profit when converted into lumber than when converted into pulp and water, so that only such timber, and only such parts of saw timber, as are not fit for lumber will be used for paper. In other words, the cut for pulp will long remain only a small percentage of the total cut. Still, making due allowance for this fact, it is perfectly clear that *the Southern forests, under intensive forest management, could support the entire paper industry of the nation, in addition to a very large lumber industry, and scarcely feel the drain.*

In a few places, here and there, forestry is being practiced, and a comparison of the results with similar practices in the North is significant.

In New England three years and one transplanting are required to bring nursery trees up to a size suitable for setting out in the forest. The cost ranges from $10 to $20 per acre.

At Bogalusa, La., the Great Southern Lumber Company has been carrying on reforestation operations for the last few years. In March of 1922 the seed of loblolly pine were sown in beds. By "November of the same year the beds were full of fine, stocky plants, 450,000 of them, ready to put out in their final location. That was done with the spacing of 6x8 feet—about 900 to the acre—and the total cost of the work, fencing cost (of 30,000 acres) prorated, supervision and overhead not in, was a little over $4 per acre." The Great Southern Lumber Company in 1922 and 1923 planted 1,000,000 young trees; their 1924 schedule called for the planting of 5,000,000 more.

The president of a Scandinavian mill that controls 800,000 acres, and has been practicing scientific forestry for forty years, is reported to have said that his pulpwood costs him $9 per cord laid down at the mill. Contrast this with $18 or $20 at the mill for our Northeastern mills and $5 for our Southern mills. Is it any wonder that one hard-pressed New England paper mill man, unaware of our own Southern resources, should exclaim that it is now too late for American pulp mills to adopt reforestation measures, since our Scandinavian competitors can put our American mills out of business before our cultivated forests are ready to be harvested?

On the 9th of last April Austin Cary, logging engineer for the United States Forest Service, delivered an address before the technical section of the American Pulp and

VOLUNTEER SEEDLINGS FIVE YEARS OLD, SIX TO TWELVE FEET HIGH

Paper Association in New York city, in the course of which, speaking of Southern timber resources, he said:

"Timber is available today over vast areas, at but a small fraction of the cost to Northern mills. * * * Timber production is so easy and rapid that it looks as if, should prompt and well-judged measures be taken, the cost of standing wood need never rise beyond, say, $2 per cord."

Since it requires about twice as long to raise saw timber as it does to raise pulpwood, there seems to be little likelihood of its being undertaken on any large scale by private enterprise, at least in our day and generation. Therefore, every year will add a few million acres to the cut-over or potential pulpwood area.

Furthermore, an estimate of the possible second-growth timber in the South omits one very large source of pulp material—saw mill slabs and other waste. Every sawmill turns out an immense amount of waste material, such as sawdust, slabs, forest waste, etc. One of the large Southern sawmills made a careful survey a few years ago of its waste materials and found that every day of operation produced enough waste for the concurrent manufacture of 794 tons of paper—enough to keep a monster paper mill busy year in and year out. And it is interesting to note the other by-products that one mill had been wasting every day: 60 tons of rosin, 6000 gallons of turpentine, 12,000 gallons of grain alcohol. They forthwith went into the by-product and paper business, are today turning out a high grade of kraft paper selling in competition with that made in other parts of the country, and plan to produce at least 600 tons per day as soon as feasible. Furthermore, they are applying the most scientific methods of forestry to their immense timber holdings. When they can no longer cut saw timber, they will have a perpetual and abundant supply of pulpwood from their own holdings. If we may make a forecast based on the past achievements of the research chemist and his activity in the paper industry more than on any publicly known methods or advances, it would be that by the time this company's saw timber is exhausted and they turn to paper making as their main industry, they will not be restricted to the manufacture of kraft, but will be able to make newsprint, book and even fine papers from their slash and loblolly pines.

From the point of view of the lumber-mill operator, all logs fit for saw timber yield a much greater profit when converted into lumber than when converted into paper. Only those parts not fit for lumber can be profitably used for pulping. But from the point of view of the community, wood used for paper is more profitable than wood used as lumber. Paper making is a more complex and difficult operation than the simple sawing of logs into boards. Logs transformed into paper bring a much higher price than logs transformed into lumber. In other words, the value added by manufacture is larger. And this value goes largely to the community. Of a pulp and paper mill and a sawmill, each operating on the same material, the pulp and paper mill will pay about three times as much in wages. The result is more wages for the community to spend, a busier populace, fewer unemployed and more money to pass through the hands of the merchants. Moreover, paper making requires numerous chemicals that must be procured somewhere, and when these can be produced in the same section in which the industry is located, as is the case in the South, this stimulates the circulation of money and advances the self-sustaining completeness of the entire section. Therefore, while it is never profitable in the long run for a community to make pulp of a material that can be better used for lumber, it will be well worth the while of the Southern states to go out

NOTE UNIFORMITY OF THE SIZE OF THE YOUNG PINES PROTECTED FROM FIRE

Seedlings All Sprang Up After a Fire Swept the Field Bare of Young Trees Two or Three Years Ago In Contrast With View on Opposite Page Which Was Burned Over Regularly

after the paper industry, and to stimulate research to determine just where the line should be drawn between pulpwood and saw timber.

In addition to the supply of pulpwood that proper forestry methods would render literally inexhaustible, the South produces an abundance of the other raw materials used in the pulp and paper-making processes. All of our rosin comes from the South. The finest white clay found in the United States occurs in the great kaolin deposits of Georgia. Lime, salt cake, soapstone and alum, all of good quality and abundant quantity, are Southern products.

Southern streams furnish an adequate supply of fresh, clean water.

In addition to all raw materials, ample power is available from good steaming coal locally mined and cheap, from the already highly-developed superpower system, or, in some sections, from the natural gas of immense natural-gas fields.

The South's labor situation is the best in the United States. The proportion of foreign stock to the total white population ranges from 1/8 to 1/12 what it is in the other sections of the country. The unrest and dissatisfaction that have so disturbed the labor situation of the North and West are little known in the South. Authorities who have investigated the labor situation consider labor to be as steady and efficient as that to be found elsewhere, and better satisfied, more reasonable and—with milder winters and lower living costs—able to work for lower wages.

As compared with other sections that have large stands of pulpwood species, the South is nearer the great markets of the East and, in addition, affords large local markets—much larger than the Far West.

One may well wonder why the paper industry has for so many years overlooked this section, so richly equipped by nature to be the great, permanent home of the nation's paper industry. The reason, as has already been stated, is very simple. Until recent years it was not thought possible to make paper from Southern woods, while spruce, the best pulpwood for the older processes, grew in great abundance in the North. But concurrently with the decline of the spruce and other Northern pulpwood supplies, and, in fact, greatly stimulated by that decline, research has developed processes for successfully making paper from Southern woods. The rosin, from being an insurmountable obstacle, has become a matter of little concern, if not, indeed, an asset, as a by-product, and bids fair to become a very considerable asset in the near future.

Figures published by the Federal Tariff Commission in 1922 give domestic production of paper as 7,017,800 tons, classified as follows: Book paper, 981,919 tons; boards, 2,156,113; wrapping paper, 1,048,393; fine papers, 361,050; newsprint, 1,147,688; and all others, 1,022,637.

The South is already making about 150,000 tons of kraft wrapping paper annually from Southern pines. Where the processes are adjusted to the resinous woods the product is comparable in value to that made elsewhere. Pine kraft in the past has been very inferior, due to this difficulty of the rosin, and much of it still is, because correct methods of handling the pine are not universally understood.

Excellent book paper is being made from a mixture of Southern pine and gum, and one enterprising publisher has his print shop next door to the mill that makes his paper, so that he pays no freight on his paper. While the output of book paper is still small as compared with the total, the fact is being demonstrated that it can be made in the South more profitably than in the North.

Wall boards of various kinds form the largest single class by weight, if not by value. They vary from a many-

NOTE COMPLETE ABSENCE OF YOUNG TREES ON FIRE SWEPT LAND

This Land Regularly Burned Over Each Year With Idea That It Provides Better Grazing for Cattle. A Practice Which Might Be Called Burning Dollars to Save Nickels

ply board, built up of layers of very tough paper and exceedingly tough and strong, to a thick, soft, heat-insulating board made of bagasse, the stalks of sugar cane from which the juice has been compressed. Some of them can be more profitably made in the South than elsewhere, while others, such as that made from bagasse, can scarcely be made any where else, since the sugar cane will not grow outside the South.

Newsprint paper is not now being made in the South, a great many in the industry, due to greater opportunity for lower costs in the South.

"This does not affect, however, the pulp and paper opportunity as a whole in the South. Kraft paper is only one item and I do think that more effort and more thought should be given to the establishment of mills producing other kinds of products just as suitable as kraft. The market will still stand additional kraft mills, but almost any community in the South that has a railroad and a pine

COVINGTON (VA.) PLANT OF THE WEST VIRGINIA PULP AND PAPER CO., INC.

and it is an item of primary importance to the industry. Recent developments not yet made public justify the statement that the manufacture of an excellent grade of newsprint paper in the South from Southern woods at an early date now seems an assured fact.

Excellent bond paper is being made from cotton linters, while various small-scale operations are being carried out on other materials, such as writing paper from Florida saw grass. Some of these may develop into large and important sources of paper in the future, though little can be said of their importance to the paper industry as a whole at this time.

Some have said that too much attention is given to the manufacture of kraft paper at the expense of other kinds of paper, and possibly at the expense of an overproduction of kraft. In this connection the words of one of the best authorities on the subject in the country are particularly apt:

"I do believe there is some danger of overproduction of kraft paper in the South. There has been a tremendous jump to date, and so much expansion and so many new mills are under way or being considered that there is danger of killing the goose that lays the golden egg, especially as some of this production is not high quality product. It is not an easy thing to kill off all the Northern kraft mills, even though such a thing is considered inevitable by tree is thinking about building a kraft mill."

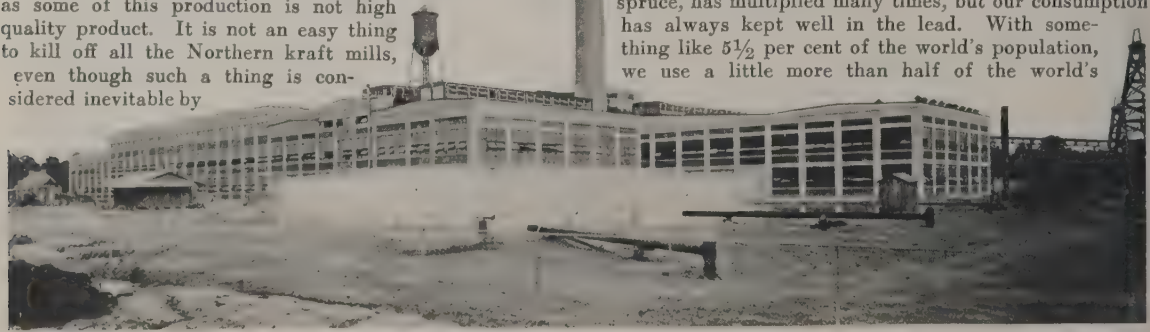
The greater opportunity, then, would appear to lie in the manufacture of some other forms of paper that may be made from Southern woods.

A brief survey of the conditions throughout the paper and pulp industry of the United States will give a better idea of the commanding position held by the South.

In 1922, the record high year for the industry so far, the United States consumed 8,000,000 tons of paper. To meet our consumption and small exports, 9,148,000 cords of wood were used. Of this we cut 4,500,000 cords from our own forests, and imported the remaining 4,648,000 cords, either as paper, pulp or wood.

Only 88 per cent of the paper consumed in 1922 was manufactured in the United States; only 60 per cent of the pulp used in making the paper consumed was a home product, and only 49 per cent of the wood used in meeting paper requirements came from our own forests.

All our imports of pulpwood are from Canada, but a considerable portion of the pulp imported comes from the Scandinavian countries. Our paper industry, since the introduction of the process for making paper from spruce, has multiplied many times, but our consumption has always kept well in the lead. With something like 5½ per cent of the world's population, we use a little more than half of the world's



BROWN PAPER MILL CO., INC., MONROE, LA.

production of paper. And while we manufacture 88 per cent of our paper, we grow more than half of the pulpwood used for our total consumption in Canada and overseas, while right here at home we have discovered an inexhaustible supply of raw material that may be had for less than that from any other section of which we know. True, Canada can practice forestry, and is already doing so to some extent. The Scandinavian countries have been practicing it for many years, and have developed it to a high pitch. But no amount of forestry will ever enable those countries to compete with our own Southern states in the growing of trees. It is claimed in Canada that by intensive forestry on good land an acre may be made to bear 20 cords of spruce in forty years. Possibly it can. An acre of equally good land in the South, under less costly management, will bear forty cords of wood in twenty years, or eighty cords in forty years. Why wait for spruce?

Several factors have operated to enable Scandinavian, German and Canadian mills to overcome the freight charges and compete with American mills in American markets, chief of which have been low wages, dwindling American supply, and, in the Scandinavian countries and Germany, well-developed forestry practices.

Since the war the conditions have somewhat changed. The principal—the most significant—change is the one already mentioned—the great development of processes for using Southern woods. The industry could not expand in the Northeast if the foreign costs of manufacture doubled and trebled. The wood simply isn't there. The expansion in the pulp industry must take place in the South, and the paper mills, for the sake of economy, will as inevitably follow them.

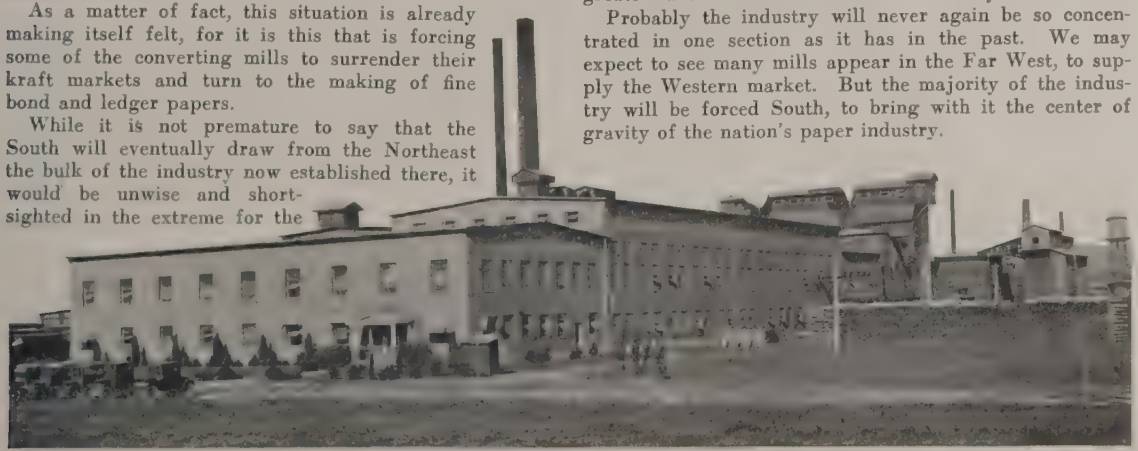
The Southern manufacturers of kraft today have an advantage in operating cost of $30 over the manufacturers of the Northeast. It has already been mentioned that some Southern mills turn out a very poor grade of kraft, and fully justify the prejudice against pine kraft, *as far as it applies to them.* But, unfortunately, these mills hurt all the manufacturers of kraft. The result is a differential of $15 per ton in market price against the pine kraft. Even taking this differential into account, however, the Southern mill has an advantage of $15 per ton over the Northern mill. At this time they are simply making a larger profit than the Northern mills. Should there be a serious overproduction of kraft, Southern mills could sell below the operating cost of Northern mills and still make a very decent profit. And eventually the differential against pine kraft will be overcome.

As a matter of fact, this situation is already making itself felt, for it is this that is forcing some of the converting mills to surrender their kraft markets and turn to the making of fine bond and ledger papers.

While it is not premature to say that the South will eventually draw from the Northeast the bulk of the industry now established there, it would be unwise and short-sighted in the extreme for the South to depend upon this source for the expansion of her paper industry. As long as we raise half our pulpwood in Canada and across the ocean—as long as we raise any important part of it abroad—the South will have ample field for expansion without depending upon attracting the industry from any other part of this country. We are now importing more than a million tons of paper annually, in addition to about 3,500,000 cords of wood (as wood or as pulp). This means to consider paper imports to start with, a million tons of paper, most of which should be made in the South, from Southern woods. But taking into account the much larger imports of wood and pulp, it means very much more. Southern mills cannot go after this import trade without causing drastic readjustments in the domestic industry. The converting mills in the Northeast—that is, the paper mills that operate on purchased pulp rather than on pulp of their own manufacture—will suffer first. It is these mills that are surrendering their kraft markets and turning to the manufacturing of fine papers, or are going on the rocks.

The immediate prospect, then, is one of dividing our 8,000,000-ton consumption between the mills of the South and those of the Northeast that operate their own pulp mills. Some allowance must be made for the few mills scattered through the West. However, this is a very simple statement of a problem that will prove very complex in the solution. As the pulpwood supply of the Northeast dwindles, and as the processes for utilizing Southern woods become more highly developed, there will be a movement of the industry from the North and East to the South. It is inevitable. The South may not desire to see pulp and paper mills dismantled and closed down and the populations of the little towns that depend on many of them as their chief sources of business scatter in the search for employment elsewhere, while the towns become dotted with many empty houses. It may exceedingly regret such a state of affairs. But the South is powerless to prevent it. The industry in these sections has never cultivated its timber crops. It has mined it. Now the whole section must pay the price, while the industry goes elsewhere to farm trees where trees will grow more rapidly. Let the South see to it that it makes a permanent home for the industry by wise legislation that will insure perpetual supplies of pulpwood. Else the South, in her turn, may see the industry again pick up and move, bag and baggage, grinder and Fourdrinier, to some other country, possibly some South American country, where forests still flourish and regrow with even greater luxuriance than in our own country.

Probably the industry will never again be so concentrated in one section as it has in the past. We may expect to see many mills appear in the Far West, to supply the Western market. But the majority of the industry will be forced South, to bring with it the center of gravity of the nation's paper industry.



MEAD FIBRE COMPANY, KINGSPORT, TENN.

Past, Present and Future of Forestry and Lumbering in the South

By Bolling Arthur Johnson, Editor and Publisher Lumber World Review, Chicago, Ill.

As long as grass grows green and rivers flow, the sixteen Southern states of this Union may account their forests and the products thereof one of their chief, natural resources.

In that paragraph above are the words which form the foundation stones upon which will be builded a superstructure of logic, based on all known facts, to prove that statement, so clear cut and positive, in the end, that any man with an open mind who has followed through will be convinced that every word of it is true; but to accomplish this history the citizens of the South must do something more than sit in a row and twiddle their thumbs in the simple belief that facts may grow out of hope alone!

Bolling Arthur Johnson

Richard H. Edmonds, founder and editor of the Manufacturers Record, who celebrates his fiftieth year in newspaper work, asked the writer to contribute a monograph on "The Past, Present and Future of Forestry and Lumbering in the Southern United States"; and so, from an experience of thirty-five years of travel and observation in the sixteen Southern states from Maryland to Texas, including the border states of West Virginia, Missouri and Oklahoma, there will be told many human truths about the timber and lumbering industry, both from personal experience and from all the sources known to the craft. This story shall be told with the single purpose of righting a great wrong that has been done the industrial South, namely, that lumbering in the Southern United States is a dying industry, when, as a matter of fact, it has only taken on the habiliments of permanency, and really just begun to live sanely.

The cutting of boards and home roof beams has been done in the South Atlantic and Gulf states since the arrival of the first settlers in America, and there is not a living soul who can guess how long it will last, but there is a reasonable expectancy for hundreds of years to come; and just the other day one of the sanest men this writer ever knew, when asked his opinion of the probable duration of the life of lumbering in the South, with the Yankee trick of himself asking a question, laughingly replied:

> "How long will the sun rise and set? Now, to be serious and as to my own business, it is permanent. It will last as long as any of my descendants care to prosecute it. I have been at it over 35 years and I have a twenty-year-old son who is now as good a lumberman as I am, and has no other thought than to get all his school days behind him and then to wear any mantle that may fall from my shoulders. His children's children, if they wish, may continue to make lumber in this Southern state, as long as they please."

This man worked out the problem of reforestation for himself in a section of a great Southern Commonwealth.

Knowing and feeling keenly the great injustice that has been done the manufacturing lumbering industry of the United States, North, East, South and West—and especially to the South—it is desired that whoever reads these lines should know that the writer takes this matter seriously, and that while he would like to write this story so lightly and so whimsically that it would even interest an Adventure Magazine addict, he wishes to assure his readers that he is not a Sancho Panza fighting windmills, nor a Knight Errant on his way to Jerusalem in search of the Holy Grail, but just a plain citizen who wants to help.

A Census of the Trees Suggested

A very popular indoor sport of the editorial pencils of this country is to inveigh against our Government bureaus at Washington, to show that the bureaus know not their work, and are filled with time-serving operators who know not their business. There was a time—when this writer was not so orthodox as today—when he believed such things as the popular mind now accepts as regards bureaus; but it is here desirable to record the fact that a close investigation running through many years has developed in his mind an idea that three departments of our Government—the Bureau of Engraving and Printing, the Government Printing Office and the Forest Service of the Agricultural Department at Washington are marvelously managed in the line of great good to all citizens of this country, and that the Forest Service stands at the head of the rest, and that, quite probably, the rank and file of the lumbering industry of the whole country, and particularly of the South, understand but little of the Forest Service and its work.

The writer says all this in face of the fact that he often is compelled to be at variance with the findings of Washington bureaus, and is now about to give place to a statement which, at first blush, might seem quite incompatible with the statement of the opening paragraphs. The statement, too, is from a man outside of Government employment whose business it is to know all that a human mind can comfortably carry concerning the industry of lumbering and of tree growing and of forestry.

Now, before all else, the reader must remember that the longevity of the lumbering industry in the South depends on the number of trees now in existence; the rate at which they are being cut; the rate at which nature restores the forest; and to what extent man can assist, profitably, in reforestation.

The gentleman referred to in the foregoing paragraph believed, with this writer, that if this everlasting hammering, upon the Southern lumber industry, by calling it a dying industry and casting aspersions upon its leading men, and insisting upon terming all lumbering operations a phase of "devastation," by the American press, cannot be stopped by advertising campaigns, and by truthful propaganda, then we should demand, as an industry, a Government census of the trees, to show how much alive and legitimate is the business of lumbering.

In this connection—after our having stated that the manufacture of lumber in the Southern states is practically a permanent industry, nearly as much so as corn or cotton raising—it may become quite necessary to introduce a few witnesses in the case. With this statement we come to the assertion of the knowing gentleman referred to and shall quote from him a concise statement concerning tree growths, as follows:

> "The United States Bureau of Corporations in 1911

reported that the annual growth of timber in the United States was then one-third of the annual cut. As the annual cut that year was 45,000,000,000 feet, that, if true, made our annual tree growth for 1911 nearly 15,000,000,000 feet.

"In 1920 the Forest Service of the United States, in its Senate report, said that 'timber depletion is more than four times as fast as new timber is growing.' That is to state, that the annual growth for that year was 10,000,000,000 feet, for the production in 1920 was supposed to be 40,000,000,000 feet.

"Now, in the year of our Lord 1924, the Forest Service reports that the annual depletion of timber is six times the annual growth.

"Since 1911 Government statistics show that nearly 80,000,000 more acres of forest land were lumbered. The first thing I want to know is, to be personal about this matter, has something happened to our lands? Does God's sun shine with a different slant? Is the rain distribution changed? Are the seasons changing? Because, if this last statement is more than a guess, and is in any sense true, the cut-over timber lands of our country are only producing one-half as much regrowth now as they did fifteen years ago."

The only sensible answer to this whole matter is that our great bureaus at Washington have been so handicapped by lack of appropriation and general lack of Congressional and Senatorial courtesy in giving them some sort of decent financial support that none of them has been as thorough in its work as it should have been. The truth about this matter is that none of us will ever know the facts about the regrowth of timber and the depletion thereof until several millions of dollars a year have been spent for a number of years in the task of finding out just what are the exact facts concerning the timbered possessions of our country. Especially and particularly is this information desired concerning the sixteen Southern states, in whose particular interest these statements are made.

A Literary Authority Considers Tree Cutting and Soil Protection

Herbert Quick, who is better known as a novelist than as an economist or sociologist, and who is chiefly known to modernists as the author of "Vandemark's Folly" and "The Hawkeye," published just before the Great War a very marvelous book entitled "The Good Ship Earth"—a book which for the better education of our youth, in regard to the use of the earth from which we spring, and to which we return, should be a textbook in all our public schools, and from that book we are going to quote some words of wisdom a little later on in regard to the necessity of husbanding and also marketing the trees for the benefit of man.

Before we introduce Herbert Quick, let this writer make a statement all his own, which needs no further proof than any man may venture to accumulate for himself any day he choose to turn investigator.

Go into the crowded street and, emulating the example of the Ancient Mariner, button-hole every tenth man you pass in an hour's walk, and ask each of them this one question: "What do you know about the business of lumbering and of the depletion of the forests?" We venture to say, because we tried it one time for a few hectic hours and know whereof we speak, that 75 per cent of those citizens will say: "Oh, about lumber and lumbering, I could not have much interest in that, could I, for I understand that the trees are nearly all gone, and that of the 822,000,000 acres of timber we had when the Pilgrim Fathers landed, there only remains today," etc., etc. Also, we get no different answer from a prominent Western Senator and from a prominent forester who became an active governor recently of one of the older Eastern states, seeking to put the burden of reforestation upon the lumbermen who cut the trees, rather than upon the citizens whose homes were built of wood for hundreds of years and who should share the responsibility.

Many public speakers and editors have called the attention of the public to the number of acres of timber we had when the Pilgrim Fathers landed—which was never anything but a guess—and then subtracted the number of acres of timber we now have—another guess—from the Pilgrim Fathers' total, until the majority of our citizens have come to consider the lumbermen as absolute criminals, which is a great injustice which we shall inveigh against as long as there remains an opportunity in America to spread about the written word.

This misinformation has been given out for the alleged purpose of awakening public interest in tree growth and reforestation, and has fallen short of all that, by handicapping a most necessary industry, which the business press of the country should be willing to devote a large part of its existence in the future to help to lift the burden from the shoulders of that industry and place where it belongs.

The present-day reformer screams: "Let the lumbermen restore the trees; they destroyed them." And the public has believed the reformer too often and too much.

Right here enters Herbert Quick. He was addressing himself, in a chapter of "The Good Ship Earth," to "The Riddle of the Raw Material of Man," and was writing particularly about soil depletion, and how to prevent the running off into the oceans of the wealth of the United States, in the shape of soil, which a careless citizenry has failed to save by shoring up the hillsides with terraces. We will allow Mr. Quick to exonerate both the lumber industry and the Pilgrim Fathers when he states:*

"If it be after a rain, the river—any river almost—will be roily. If it be the Missouri, the Tennessee, the Ohio, the Red, the Platte, the Arkansas, the Sacramento, the Alabama, the Lower Mississippi, or any one of a hundred others, it will be found turbid with earth, whether one looks just after a rain or not. And in this fact lies one of the greatest dangers to our part of the ship.

"What is it which discolors the rivers? It is soil. What is soil? I might give you a long and learned definition, but the plain English of it is, soil is the looser earth, spread over the surface, and in which plants can grow. It is an essential part of the raw material of man—and woman.

"It is the dust which has gathered on the decks of the Good Ship Earth by the trampling of the feet of the rain and hail, the grinding hoofs of the ice, the crushing and prying lever of the frost, the wearing sandblast of wind-blown particles and the washing of the waters. Until soil appeared on the ship, there were decks clean as cement sidewalks, or sterile as piles of building stone—but no place for the green rash breaking out on the decks which we call vegetation. And until vegetation came, there were no animals, because they must have the raw earth worked over in plants or other animals before they can assimilate it.

"It took more centuries than you have hairs in your head to make a good soil. In the millenniums which have passed there has been a race between the accumulation of vegetable matter and the earth-dust made by the elements and the forces carrying it away, in which the deposits of soil have managed to keep just a little ahead of the natural wastage by blowing, washing and other erosion. Maybe on a square foot there would be a teaspoonful more of good soil at the end of a century than at the beginning. Increasing at the rate of a teaspoonful a century, given centuries enough, and the soil is eight inches deep, though the average soil is shallower than that.

"In his action on the soil, man has shown most strikingly that he (and he only of all animals) has been clothed with power to destroy the globe from which he has emerged, as far as habitability is concerned. He finds a new continent covered with trees. Beetles, scale-insects, moths, funguses and bacteria do the same thing, and they kill trees, but man is the only living being who can keep

* From "The Good Ship Earth," copyrighted 1913. Used by special permission of the publishers, the Bobbs-Merrill Company.

them killed. Beavers can cut them down, but man alone keeps them cut down. He found the American continent covered with trees, in large part, and that just at the era when tree-cutting machinery had been or was about to be perfected, and he proceeded to destroy forests over an area half as large as Europe. He has been obliged to do this in order that he might found states, build a nation and extend civilization. He has destroyed the splendid forests which were the fruition of hundreds of years of growth; but it is hardly just to blame him or to condemn the destruction as waste.

"It was unavoidable destruction, and in the main justifiable.

"If the Pilgrim Fathers could have landed at Kansas City instead of Plymouth Rock, it would have been immensely better. The first settlers would have had prairie land quite ready for the plow on which to live. The colonies would have spread over the Mississippi Valley, with their cattle ranges in the semi-arid Great Plains. As more land became a necessity, they would have worked their way into the forests of Indiana, Missouri, Wisconsin and Minnesota—and finally, after densely peopling the prairies of Iowa, Nebraska, Kansas and the Dakotas, and rich forest plains of Indiana, Kentucky, Ohio, Oklahoma, Missouri, Arkansas and Tennessee, the black lands of Mississippi and Alabama, the fertile Mississippi Delta from Cairo to the Gulf, and the Coastal plains of Texas, the frontier states of the Atlantic Coast would have been reached by the lumbermen and pioneers. New England would not yet have been opened to settlement. The Appalachian Mountain region would still be a forest. And the Ohio, the Cumberland, the Upper Mississippi, the Tennessee and the Mobile would not flow as they do, thick with the liquid soil from the fields of their valleys. But coming in, as the settlers did, from the East, they were forced to lay waste the forests."

Let the South Inaugurate Measures to Restore Its Timbered Areas

It is the task of the citizens of the South to help to do the few little things necessary, that such cut-over areas of the South which God meant only for trees may again teem with tree growth. When one species of tree passes, like as not another species grows up in its place, for the lands where trees grow in the South are, in many instances, suitable only for tree growth.

In North and South Carolina and in Virginia long-leaf yellow pine was growing when John Smith landed at Jamestown. That fact was recently shown in many ways.

Through the great library of information which Daniels, when he was public printer of North Carolina, collected and printed we find many records of contracts, specifying and itemizing great cargoes of pitch-pine timbers for export in the early days of the Seventeenth Century.

In 1743 Lawrence Washington built the residence of the Washington family at Mount Vernon out of long-leaf pitch-pine trees cut in Virginia, and covered it with cypress shingles cut in North Carolina.

Since that day and time the long-leaf pitch-pine tree has disappeared from Virginia and North and South Carolina, but the short-leaf yellow pine has grown up in those states. It has regrown on the same lands which bore the long-leaf pine tree, and from those lands has been marketed ever since, and today that soil is so happily adapted to tree growth that it needs no statistics compiled by any bureau to show any lumberman that the trees will continue to grow in that territory and elsewhere in the South.

Statistical Information so Perfect That It Is Almost a Lyric

If anyone wished the least bit of evidence of the efficiency of the Forest Service of the United States, he would only need to study for a few moments the comprehensive tabular statement which, through the courtesy of the Forest Service, we are able to present to the readers of the Manufacturers Record and to the whole of the lumber South concerning lumber production in the sixteen Southern states covered in this review. This information runs from the year 1839 to the year 1922, inclusive.

The reader will observe in perusing these tables that from 1839 to 1859, inclusive, the figures are given in values of the lumber production of the South, and that

Value of Lumber Production in the South, 1839-1859

State	Value 1839	Value 1859	Value 1849
Virginia	$538,092	$977,412	$2,201,187
Maryland	‡226,977	‡614,168	‡626,989
North Carolina	506,766	985,075	1,074,003
South Carolina	537,684	1,108,880	1,124,440
Georgia	114,050	923,403	2,412,996
Florida	20,346	391,034	1,476,645
Alabama	169,008	1,103,481	1,873,484
Mississippi	192,794	913,197	1,823,627
Louisiana	66,106	1,129,677	1,575,995
Texas	.....	466,012	1,735,454
Kentucky	130,329	1,502,434	2,463,085
Tennessee	217,606	725,387	2,199,703
Arkansas	176,617	122,918	1,155,902
Oklahoma	.....	.....	.....
Missouri	70,355	1,479,124	3,074,226
Total South	$2,966,730	$12,442,202	$24,817,736
United States	$12,943,507	$58,521,976	$93,338,606

Production of Lumber in the South by States, 1869 to 1922

State	1869 Qauntity Board feet	1879 Quantity Board feet	*1889 Quantity Board feet	†1899 Quantity Board feet	1909 Quantity Board feet
Virginia	144,225,000	315,939,000	415,512,000	959,119,000	2,101,716,000
West Virginia	76,375,000	180,112,000	301,958,000	778,051,000	1,472,942,000
Maryland	‡96,165,000	‡127,336,000	82,119,000	183,711,000	267,939,000
North Carolina	124,938,000	241,822,000	514,692,000	1,286,638,000	2,177,715,000
South Carolina	95,098,000	185,772,000	198,764,000	466,429,000	897,660,000
Georgia	245,141,000	451,788,000	575,152,000	1,311,917,000	1,342,249,000
Florida	158,524,000	247,627,000	411,869,000	790,373,000	1,201,734,000
Alabama	97,192,000	251,851,000	589,480,000	1,101,386,000	1,691,001,000
Mississippi	160,584,000	168,747,000	454,417,000	1,206,265,000	2,572,669,000
Louisiana	76,459,000	133,472,000	303,726,000	1,115,366,000	3,551,918,000
Texas	106,897,000	328,968,000	842,648,000	1,232,404,000	2,099,130,000
Kentucky	214,074,000	305,684,000	423,185,000	774,651,000	860,712,000
Tennessee	204,751,000	302,673,000	460,261,000	950,958,000	1,223,849,000
Arkansas	78,692,000	172,503,000	537,884,000	1,623,987,000	2,111,300,000
Oklahoma	.....	.....	2,552,000	22,104,000	225,730,000
Missouri	329,676,000	399,744,000	402,052,000	723,754,000	660,159,000
Total South	2,208,791,000	3,814,038,000	6,516,271,000	14,527,113,000	24,458,423,000
United States	12,755,543,000	18,091,356,000	23,845,046,000	35,084,166,000	44,509,761,000

PRODUCTION OF LUMBER IN THE SOUTH, BY STATES, 1869 TO 1922, CONTINUED

State	¶1913 Quantity Board feet	*¶1914 Quantity Board feet	¶1915 Quantity Board feet	¶1916 Quantity Board feet	¶1917 Quantity Board feet
Virginia	1,273,953,000	1,488,070,000	1,500,000,000	1,335,000,000	1,060,000,000
West Virginia	1,249,559,000	1,118,480,000	1,110,000,000	1,220,000,000	890,000,000
Maryland	140,469,000	162,097,000	165,000,000	90,237,000	68,000,000
North Carolina	1,957,258,000	2,227,854,000	2,090,000,000	2,100,000,000	1,460,000,000
South Carolina	752,184,000	701,540,000	800,000,000	857,000,000	745,000,000
Georgia	844,284,000	1,026,191,000	1,000,000,000	1,000,000,000	740,000,000
Florida	1,055,047,000	1,073,821,000	1,110,000,000	1,425,000,000	1,230,000,000
Alabama	1,523,936,000	1,494,732,000	1,500,000,000	1,720,000,000	1,555,000,000
Mississippi	2,610,581,000	2,280,966,000	2,300,000,000	2,730,000,000	2,425,000,000
Louisiana	4,161,560,000	3,956,434,000	3,900,000,000	4,200,000,000	4,210,000,000
Texas	2,081,471,000	1,554,005,000	1,750,000,000	2,100,000,000	1,735,000,000
Kentucky	541,531,000	596,392,000	560,000,000	525,000,000	360,000,000
Tennessee	872,311,000	885,035,000	800,000,000	700,000,000	630,000,000
Arkansas	1,911,647,000	1,796,780,000	1,800,000,000	1,910,000,000	1,765,000,000
Oklahoma	140,284,000	200,594,000	230,000,000	240,000,000	240,000,000
Missouri	416,608,000	370,571,000	350,000,000	260,000,000	275,000,000
Total South	21,532,683,000	20,933,562,000	20,965,000,000	22,412,237,000	19,388,000,000
United States	38,387,009,000	37,346,023,000	37,011,656,000	39,807,251,000	35,831,239,000

PRODUCTION OF LUMBER IN THE SOUTH, BY STATES, 1869 TO 1922, CONTINUED

State	¶1918 Quantity Board feet	†**1919 Quantity Board feet	¶1920 Quantity Board feet	*1921 Quantity Board feet	¶1922 Quantity Board feet
Virginia	855,000,000	1,098,038,000	1,014,400,000	592,979,000	617,493,000
West Virginia	720,000,000	763,103,000	697,600,000	467,002,000	554,277,000
Maryland	71,000,000	113,362,000	85,600,000	71,169,000	54,358,000
North Carolina	1,240,000,000	1,654,435,000	1,246,700,000	931,015,000	936,248,000
South Carolina	545,000,000	621,679,000	610,500,000	684,333,000	854,799,000
Georgia	515,000,000	893,965,000	761,800,000	792,579,000	809,391,000
Florida	950,000,000	1,137,432,000	1,000,900,000	922,332,000	980,014,000
Alabama	1,270,000,000	1,798,746,000	1,439,200,000	1,386,426,000	1,457,608,000
Mississippi	1,935,000,000	2,390,135,000	2,224,000,000	2,081,520,000	2,267,695,000
Louisiana	3,450,000,000	3,163,871,000	3,120,000,000	3,215,110,000	3,386,000,000
Texas	1,350,000,000	1,379,774,000	1,328,800,000	1,502,333,000	1,542,708,000
Kentucky	340,000,000	512,078,000	421,100,000	255,922,000	210,360,000
Tennessee	630,000,000	792,132,000	779,800,000	451,937,000	485,979,000
Arkansas	1,470,000,000	1,772,157,000	1,452,200,000	1,301,095,000	1,382,032,000
Oklahoma	195,000,000	168,403,000	163,400,000	120,371,000	149,328,000
Missouri	273,000,000	321,383,000	274,200,000	158,418,000	201,849,000
Total South	15,809,000,000	18,580,693,000	16,620,200,000	14,934,541,000	15,890,134,000
United States	31,890,494,000	34,552,076,000	33,798,800,000	26,960,864,000	31,568,888,000

* Excludes custom mills (sawing 3,196,527,000 feet in 1889).
¶ Mills cutting less than 50,000 feet each year excluded.
‡ Including District of Columbia.
† Includes both merchant and custom sawing.
** Including 2,655 mills cutting less than 50,000 feet each.

the story is told in "board feet" for each ten-year period from 1869 to 1909, then the figures run chronologically from 1913 to 1922, inclusive, making a figure-picture of enormous importance to the South when we compare the lumber production of the sixteen Southern states with the total lumber production of the United States.

The writer wishes to submit the information as the most powerful which can be produced to illustrate to the timber and lumbering interests of the Southern states, and to the lumber consuming public, the paramount importance of the timber and lumbering interests of those states. To also show, beyond the reasonable doubt of any fair-minded man, that with the growing interest in forestry, with the adaptability of Southern lands to forest growth and with the wonderful forestry organizations which many of those states contain and support this production can be maintained in value of product throughout the years to come.

The general purpose of this article is to show that this condition is true.

With such institutions as the Great Southern Lumber Co. of Bogalusa, La.; the Kaul Lumber Co. of Birmingham, Ala.; the Lutcher & Moore Lumber Co. of Orange, Texas; the Krause & Managan Lumber Co. of West Lake, La.; the Kirby Lumber Co. of Houston, Texas; the Industrial Lumber Co. of Elizabeth, La.; the Urania Lumber Co. of Urania, La.; the Crossett Lumber Co. of Crossett, Ark.; the Frost-Johnson Lumber Co. of Shreveport, La., and the great Concatenated Order of Hoo-Hoo, the lumbermen's fraternity, with its nearly 9000 members, volunteering to devote its entire life and activities to reforestation, with an actual working plan contemplating the practical manner in which all lumbermen who own cut-over timberlands may go into partnership with the Government of the United States to reforest the cut-over lands of the South, reforestation of the South has gravitated into substantial fact!

Further, in this connection, a prominent official of the Forest Service of the United States, whose integrity is known to this writer, and whose professional prominence guarantees his statements, during the last days of August of this year used in correspondence a few pertinent and

epigrammatic sentences which are worth their face value. The gentleman was referring to the census of lumber production for the year 1922 when he said:

> "It is here shown that more lumber was cut in 1922 in North Carolina than in Idaho, and more in Maine than in Montana. New Hampshire led New Mexico, and Vermont and Massachusetts each produced more lumber than Arizona. Connecticut and Maryland precede Colorado and South Dakota; even Delaware and New Jersey are ahead of Wyoming and Utah. Who said the forests of the South Atlantic states amounted to nothing?"

These comparisons are not made with any idea of rousing debate or contention, but are used to accentuate a great hope for the future of forestry and reforestation in America, and to crystallize the fact that the sixteen Southern states, whose soil and salubrious climate reproduce forests more naturally and with less effort than any other in the country, will function large in all the future.

The recent publication of the "Forestry Almanac" by the American Tree Association, Charles Lathrop Pack, president, which every tree owner and lumberman in the United States should own, has furnished the writer much valuable information which, generally, tallies with the Government information available and his own personal information, and is in such convenient form that it has been very useful in compiling the Southern states material under the separate state headings, forming the bulk of this division, of this monograph.

Southern Timberland Acreage and Board Feet

There is nothing new about the original figures from which the following tabular statement is compiled, but the figures themselves have not before been put into the shape offered herewith. These figures, concerning the "acreage," the "original timbered acres," of the so-called "cut-over" acres and the "present timbered acres" of the sixteen Southern states under review, make no comparative statement of the rest of the timbered acreage of the United States, or any pretension that they are exact, but they surely represent the statistical belief of this day and time and, after all, indicate a great timberland area in those states. The figures are taken from the "Forestry Almanac," published by the American Tree Association.

Also, from the "Forestry Almanac," we gather some figures about fifteen of our Southern states as regards what is supposed to be the standing timber of those various Commonwealths. The state of Virginia seems to be a problem that nobody has solved. These figures are submitted on the same basis as the preceding table was submitted, and with the hope that all and any investigation of statements made herein will only be an added reason why there should be begun at once a Governmental census of the trees of the whole country:

Southern Timber Resources

State	Board feet
Alabama	50,000,000,000
Arkansas	76,200,000,000
Florida	48,400,000,000
Georgia	42,000,000,000
Kentucky	37,400,000,000
Louisiana	30,000,000,000
Maryland	8,800,000,000
Mississippi	81,200,000,000
Missouri	7,800,000,000
North Carolina	30,000,000,000
Oklahoma	12,000,000,000
South Carolina	28,300,000,000
Tennessee	65,000,000,000
Texas	38,000,000,000
Virginia	?
West Virginia	47,600,000,000
Total South	*602,700,000,000

* Excluding Virginia.

The Sixteen Southern States Reviewed Separately and From All Angles

The records of the Forest Service in Washington, the "Forestry Almanac" and the records of those Southern states which have state foresters have been in a general way all the authorities outside of his own archives which the writer has consulted in the creation of this monograph, and this assistance is acknowledged both as a courtesy as to the sources named and as enlightenment to the reader.

As the future of Southern lumbering and the paramount influence for the perpetuity of tree growth in these sixteen states are dependent very naturally on the forestry laws that are in force, or will be revised for their betterment, or will be put in force in nearby sessions of the legislatures of these states; in the forestry associations which are working actively and purposefully in those states; in the active work of the official state foresters of those states; and in the rapidly increasing interest which all the citizens

Timberland Area of the South

State	Area-in acres	Original timbered acres	Cut-over acres	Present-timbered acres
Alabama	32,818,560	32,000,000	6,550,000	20,000,000
Arkansas	33,616,000	32,000,000	1,850,000	22,000,000
Florida	35,111,040	28,800,000	5,300,000	16,000,000
Georgia	37,584,000	36,480,000	5,000,000	21,200,000
Kentucky	25,715,840	24,320,000	3,200,000	9,500,000
Louisiana	29,061,760	22,000,000	13,600,000	3,600,000
Maryland	6,362,240	5,760,000	350,000	2,228,000
Mississippi	27,751,680	25,800,000	3,000,000	15,600,000
Missouri	43,985,280	32,000,000	100,000	16,800,000
North Carolina	31,900,000	31,000,000	4,220,000	21,130,000
Oklahoma	44,424,960	16,896,000	1,450,000	8,800,000
South Carolina	19,516,800	17,920,000	1,900,000	12,600,000
Tennessee	26,894,000	25,600,000	1,500,000	9,000,000
Texas	170,173,000	48,000,000	4,000,000	33,000,000
Virginia	25,767,680	24,960,000	1,500,000	13,800,000
West Virginia	15,374,080	15,360,000	1,000,000	9,500,000
Total South	606,056,920	418,896,000	54,520,000	234,758,000

of the South, inclusive of the lumbermen of the South, indicate in forestry and timber matters of that section, we will review just those items as related to the sixteen Southern states which are being discussed.

But first let me mention the various forestry and lumbering associations in the territory of the sixteen states. The Forest Service of the United States maintains a Southern Forest Experiment Station at New Orleans, under the direction of R. D. Forbes—the Southern Forestry Congress to come in for special mention later—the North Carolina Pine Association of Norfolk, Va., John M. Gibbs, executive secretary; the Georgia-Florida Sawmill Association, Jacksonville, Fla., E. C. Harrell, secretary; the Hardwood Manufacturers' Institute, with headquarters at Memphis, Tenn., John M. Pritchard, secretary; the Southern Pine Association, H. C. Berckes, executive secretary, New Orleans, La.; the Southern Sash, Door and Millwork Association, Atlanta, Ga., C. B. Harmon, executive secretary—all working an interstate influence throughout all the Southern territory.

Other forestry affairs for the sixteen states will be reviewed under the name of each state, alphabetically arranged.

Alabama — Alabama has a forestry commission whose work became effective October 1, 1923; Page S. Bunker, State Forester, Montgomery, Ala.

The land area of Alabama is 32,818,560 acres, of which the original forested area was supposed to have been 32,000,000 acres, and the present forest area 20,000,000 acres, and there are unproductive forest lands of 6,550,000 acres ready for experimentation and reforestation.

There are no state forests and no national forests within the state of Alabama, and no other publicly owned forest area.

Alabama consumes a great deal of its own lumber production, but just what per cent of that production is not known, but it is placed at 50 per cent by those who are competent to make intelligent guesses.

Alabama has forest fire laws, a protective system under the new state forest law mobilizing local officials for fire protection, which make willful and negligent setting of fires a misdemeanor.

Any landowner in Alabama who wishes to devote his lands to forest culture may apply for their entry as auxiliary state forests, and enter into a contract with the State Commission to devote the lands to that purpose, the lands to be taxed on the value of the land alone until withdrawn or until the timber is cut, and then paying a tax of 10 per cent of the value of the timber thereon, or the timber cut,

There are no state forest nurseries in Alabama and the very recent establishment of the law has permitted only a general survey of the state's resources. The state expects to encourage farm forestry, and the Governor of the state may accept gifts of land to the state to be administered as state forests by the Commission.

The Alabama State Commission consists of the Governor, the Commissioner of Conservation, two land-owning farmers and three practical lumbermen who are owners of timberlands and engaged in the manufacture of lumber.

The Alabama Polytechnic Institute at Auburn has a short course dealing with timber shortage, reforestation, handling of trees and care of woodlots.

Arkansas — Arkansas has no state forestry department, but it already has one 200,000-acre forestry farm.

At the thirty-third annual meeting of the Concatenated Order of Hoo-Hoo at Minneapolis on September 10, James H. Allen, the newly elected head of that earnest body of philanthropists, which has a membership of 9000 strong, read a paper which the writer believes was one of the strongest arguments for the success of the reproduction of yellow pine timber on Southern cut-over lands he has ever heard from a lumberman in a public address. Mr. Allen's full statement follows:

> "It might be of interest for you to know that there is a group of men today who have put together over 200,000 acres of cut-over lands in Arkansas with the purpose in view of making this a timber farm. It is their plan not to cut a tree upon this land for 20 years. From Washington this group of men have secured data compiled from the records on the growth of young timber in the Southern states that go to prove that this piece of land will increase its growth one-half a cord per year per acre, or on this timber farm there will be raised 100,000 cords of wood per year. These men are building a 150-ton pulp mill, which will require 90,000 cords of wood per year. For the first 20 years this supply of wood will be bought in the open market. After that time the supply of wood for the plant will be taken from that timber farm, and the forestry experts tell the owners thereof that this 200,000 acres of land will perpetuate the life of that great plant.
>
> "Through their faith in these forestry figures, this group of men is spending $3,000,000 building the plant.
>
> "It is with pleasure—and I hope I am not violating any great rule of modesty—when I tell you that this idea was sold to the gentlemen doing this great piece of work by myself, my impulses to raise timber—that is, to put something back into my industry—and it all came to me through the doctrine of Hoo-Hoo. As a result of this I feel that Hoo-Hoo, through its untiring efforts in advertising reforestation, has brought about this 200,000-acre timber farm, and I believe the United States Forest Service, when the facts are known, will be thankful to our order for the enthusiasm with which it approaches this subject. We can now offer our Government, as a manifestation of our thinking and higher impulses, this industry and its timber farm.
>
> "Nature has given us friendly soils, friendly climates and lots of acreage in the states of Arkansas, Louisiana, Texas, Mississippi, Georgia, Alabama and other short-leaf states in which to raise yellow pine timber. The elements for the reproduction of this class of timber are there all ready for the mind of man to direct, to cultivate, to protect from fire and to hasten into a reality, in these districts, a perpetual timber supply."

There is also another forestry project in Arkansas of national reputation under the patronage of the Crossett Lumber Co. of Crossett, Ark. On September 25, 1924, the writer had a remarkable letter from Adam Trieschmann, who is at the head of that company. It is one of the six companies known as the Crossett-Watzek-Gates interests, whose interests in the South are the Crossett Lumber Co. and the Crossett Land & Development Co. at Crossett, Ark.; the Fordyce Lumber Co., Fordyce, Ark., and the Jackson Lumber Co., Lockhart, Ala., all of like character and governed by a similar ambitious spirit to that which has built up the Crossett Lumber Co.

Mr. Trieschmann wrote as follows, in reply to a letter the author had written to many Southern operators in timber concerning his plan of "A Census of the Trees," providing we cannot convince the public in any other way that lumbering and forestry will practically be perpetual in the Southern United States:

> "We can not claim sufficient knowledge nor prophetic inspiration to venture a guess on how long the timber belt of the South will be able to produce from eight to ten billion feet of lumber annually. Confining the subject to our immediate holdings, we are thinking in terms of a perpetual cut on an acreage not exceeding 300,000 acres. We are cutting logs daily that have had their birth since our operation began in 1900. This may be of some interest in drawing conclusions as to the possibilities, especially through the short-leaf belt of the South, if proper attention was given by state forestry departments as well as individuals in the prevention of fires and practical conservation methods as to leaving seed trees for a second crop."

The state of Arkansas contains 33,616,000 acres of land, of which originally 32,000,000 acres were forested, and its present forest area consists of 22,000,000 acres. There is in Arkansas so-called unproductive forest land, which it is supposed either cannot be or has not been reclaimed or reforested, to the extent of 1,850,000 acres.

There are no state forests in Arkansas, but the national forests within the state aggregate 957,247 acres, which include 18,959 acres being operated under the Weeks law.

No human soul knows how much lumber Arkansas consumes every year. Up to the present it has never had an appropriation for the purposes of forestry and no state protective system against forest fires. There are penalties, in law, for setting fire to wooded areas, but probably no more than the common law would provide in any state for setting anything on fire; but Arkansas does hold its railroads liable for causing fires, and probably there is a great preponderance of endeavor to hang the cause of all forest fires in Arkansas around the necks of the railroads.

There are no special forest taxation laws in Arkansas and no state forest nurseries.

There is a great and pliable sentiment being aroused among the citizens of Arkansas for a state forestry department.

With its large holdings of forest lands within the state the Forest Service is doing an unusually large forest-fire protection education in Arkansas.

The University of Arkansas at Fayetteville has in its curriculum a brief course in forestry.

The state of Arkansas should respond wonderfully to forestry methods, and in that state is a great possibility for profit in tree farming.

Florida — The land area of Florida consists of 35,111,040 acres. The original forested area was 28,800,000 acres; the present forest area consists of 16,000,000, and the cut-over or unproductive land is given as 5,300,000 acres. There are no state forests, and the national forests within the state consist of 337,938 acres. There are 1920 acres in state parks. There has never been an appropriation by the Florida Legislature in the interest of forestry in that state.

Florida is just on the front edges of the creation of a reforestation sentiment. It has begun early enough, however, so that there may not be applied to Florida the old adage of locking the barn door after the horse is stolen.

There was organized in Florida in March, 1923, the Florida Forestry Association, created for the purpose of educating the public in the need for protection and to secure legislation. One of its first acts was to present Florida's case before the United States Senate Reforestation Committee. It is alleged that the movement has opposition in the Florida cattle interests, whose requirements seem to be the burning over of land to improve the grazing. The enthusiasts who are interested in the Florida Forest Association have concentrated their efforts largely in an endeavor to secure the passage of a state forest law along the lines of the new Alabama law.

The officers of the Florida Forest Association are W. L. E. Barnett, president, Mount Dora; S. B. Jennings, vice-president, and Russell W. Bennet, secretary-treasurer, both of Jacksonville. R. H. Paul, a prominent pioneer lumberman at Watertown, Fla., is a member of the executive committee.

Georgia — Georgia has a State Board of Forestry, created in 1922, with powers of investigation to the limit of its applicable personal interest, but without funds. Georgia also has a Forestry Association and participates in the Southern Forestry Congress in the work of stimulating forestry sentiment in support of forest protection, conservation and reforestation. Officers of the Georgia Forestry Association are Bonnell H. Stone, Blairsville, president; C. B. Harmon, treasurer, and H. B. Spahr, secretary, both of Atlanta.

Without wishing to make invidious comparison, it may be definitely stated that Georgia contains opportunities for reforestation second to none in the South.

The area of land in Georgia consists of 37,584,000 acres, of which the original forested area consisted of 36,480,000 acres, 21,200,000 acres of which are still considered forest area. Georgia is supposed to contain 5,000,000 acres of cut-over lands. There are no state forests in Georgia, and the national forests consist of 84,417 acres.

The consumption of lumber in Georgia is easily double the amount of lumber cut, for other states of the South ship lumber into Georgia, and it is a fact that there are more sawmills today in Georgia than ever before in its history, though, of course, of small individual output.

There are no forest taxation laws, no state nurseries, and the railroads alone seem liable for damage from fires. There is an endeavor at forestry instruction by the State College of Agriculture.

Kentucky — In 1920 the Kentucky General Assembly repealed a law establishing a Forestry Commission. The 1924 General Assembly of Kentucky, at its regular session, and from its Senate, gave birth to Senate Bill No. 265 on Tuesday, February 5, 1924. This new law of Kentucky is deeply interesting.

Up to September 29, 1924, no state forester had been appointed for Kentucky, which is indeed an attractive position. The law provides a list of duties and responsibilities which even Gilbert and Sullivan's Poo-Bah might balk at and consider onerous. The life of the state forester of Kentucky will be very diversified.

The text of this Kentucky law is very curious. The forester, who is to have a salary of $3000 per year, has supervision of all forest property, the forwarding and advancing of all forests in the Commonwealth through the active management of that property, and he is to initiate such projects as will promote the appreciation of the public and that of the rising generation along the line of forest protection and reforestation, to encourage tree planting everywhere in general, and on the public highways in particular, in that seedlings may be grown, collected and distributed. He may form and foster junior forestry clubs, and is expected to co-operate with the local and civic organizations in the care and planting of trees; provide for organized forest fire protection; to co-operate with the Federal Government, state departments and landowners of Kentucky in the perpetuation of its forests and redemption of waste lands for agricultural purposes; to encourage forestry interests by correspondence, by the press and by pamphlets, and by moving pictures, under the authority and direction of the State Commissioner of Agriculture.

The land area of Kentucky is 25,715,840 acres. The original forests amounted to 24,320,000 acres and the present forest area is 9,500,000 acres, and the unproductive forest lands of Kentucky amount to 3,200,000 acres.

The state forests of Kentucky consist of 3624 acres, and the national forests the same number of acres.

The last annual appropriation for forestry in Kentucky was $15,000 under the new law. The new law provides for organized fire protection, and the laws on the statute books are sufficient but not yet duly enforced. There are no special forest-taxation laws in Kentucky.

Even after the abolishment of the Forest Commission in 1920 the state continued to maintain two nurseries, distributing trees from these nurseries to the public at cost.

Berea College, Kentucky, does practical forestry work in the management of the college forest, as it possesses a 6000-acre tract known as the Fay Forest Reserve, which the college manages on a commercial basis, and co-operates with the United States Forest Service through its Appalachian Forest Experiment Station to demonstrate to the people of the mountain regions conservation of their forest resources. The Fay Forest Reserve is carried on the books of the college as an asset valued at nearly $58,000, which makes a substantial income for the institution and gives employment to many Berea students, who last year earned 62.3 per cent of their actual school expenses at this work.

Louisiana — Louisiana has gone further in matters of forestry and conservation than any of the other Southern states under review, and antedates California even in the establishment of the general matter of conservation, as the Louisiana Department of Conservation was created in 1904 and the California State Board of Forestry was created in 1905.

V. H. Sonderegger, Superintendent of Forestry, is a member of the staff of the Department of Conservation of Louisiana, and is at the head of more kinds of activities than any other forester in the south.

As compared with other Southern states the existing statistics in Louisiana leave the investigator to wonder whether or not the additional activities in that state, compared with all other Southern states, have discovered more reliable facts than have been discovered in other states, or whether Louisiana is more nearly at the edge of the truth in regard to the proportions which exist between its unproductive forest lands, its original forest area and its present forest area than the other Southern states.

Statistics show that the area of the state as to land is 29,061,760 acres; that the original forested area, pine and hardwoods, was 22,000,000 acres; that the present forest area is 3,600,000 acres, and that the idle or unproductive forest land today runs into an aggregate of 13,600,000 acres. No statement of statistics has ever existed that someone did not rise up to controvert or confound it. Taking it for granted that this statement mirrors real facts, there is reason enough why even greater forestry activities should be instituted in Louisiana than exists today, where the last annual appropriation for forestry was $60,000.

The forest taxation law of Louisiana is considered a pattern which other Southern states should emulate, and it is believed that any interested citizen, by writing to Forester Sonderegger at New Orleans may obtain the full text of this law.

Louisiana is divided into parishes, instead of counties, the governing bodies of which are police juries, which is suggested in order to illuminate the short few words we print concerning the Louisiana general conservation law. In brief it is as follows:

This law permits the owner of land valued at not less than $3 and not more than $8 per acre to enter into a contract with the Department of Conservation for the purposes of taxation. The owner must practice forestry on the land. If necessary, plant trees, and especially protect the land from fire. The landowner must apply to the Department in New Orleans and the police jury where the land is located. The police jury sets a cash value on the lands, at which they are

to be carried on the assessment rolls for taxation purposes for ten years. At the end of that period they are reassessed for a second five years, and may be at the end of that time reassessed for another period of five years.

If the landowner fails to carry out his contract, he must, as a penalty, pay the state the difference in the amount of taxes which would accrue if the land was not under contract, plus interest at six per cent. The state of Louisiana maintains a nursery at Woodworth, but the two great show places where wonderful reforestation work is done and will always be done, and where nurseries are maintained and practical forestry is being worked out, are the sawmill plants of the Great Southern Lumber Company at Bogalusa and the Urania Lumber Company at Urania. Henry E. Hardtner of the Urania Lumber Company is the pioneer lumberman of the Southern United States to make a study of and to engage in practical forestry work, and he yet works more at the job of forestry than he does at the job of lumber making. It is to his little town in Louisiana where each year Ralph C. Bryant takes the Yale Forestry School graduating class for their last semester.

W. H. Sullivan, who has and deserves the credit for having built up the largest sawmilling institution in the South at Bogalusa, has been, since the beginning of his institution there, a magnificent patron of forestry, and employs J. K. Johnson, a practical forester, to take charge of all the activities of his company. It is at Bogalusa that a summer school of forestry gathers each year, which is maintained through the co-operation of the Department of Conservation and the State University of Louisiana to train men for forestry work.

V. H. Sonderegger, in charge of the division of forestry of the Department of Conservation of Louisiana, informed the writer recently that he had "quite a few applications on hand, approximating over 200,000 acres, from responsible landholders, who desire to enter into contract with the state on the terms of the Reforestation Act," all of whom he believed would fill the requirements.

In this same communication Mr. Sonderegger gave the writer the first exact information he has ever seen concerning the actual number of acres under contract in Louisiana, and the names of the contractors or landowners in each case. Here is the list:

	Acres
Urania Lumber Co., Urania, La	28,000
Washington Parish Co-operative Forest, Great Southern Lumber Co., Bogalusa	53,000
Ed. Langhurst, Varnado, La	1,023
Mrs. J. S. Knight, Franklinton, La	130
J. A. Knight, Varnado, La	100
Crossett Land & Development Co., Morehouse parish, La	57,691
H. H. Williams, Washington parish, La	420
Henry Williams, Varnado, Washington parish, La.	120
O. P. Schexnayder, Washington parish, La	1,080
C. B. James, Washington parish, La	80
M. C. Poole, Washington parish, La	120
G. M. Parks, Washington parish, La	80
Great Southern Lumber Co., Bogalusa, La	14,810
Krause & Managan Lumber Co., Westlake, La	22,591
Great Southern Lumber Co., Bogalusa, La	3,687

The Louisiana Forestry Association held its fifteenth annual meeting at Hammond, La., on July 5 of this year. For ten years this association held its annual meetings always at Urania, La., under the patronage of Henry E. Hardtner. Subsequent to that time two meetings have been held in Bogalusa, one at Hammond and the other two at Urania. The meetings of the Louisiana Forestry Association are always elaborate and add much to forestry literature.

Major J. G. Lee of the Louisiana State University, who superintends each year, with J. K. Johnson of Bogalusa, the six weeks' summer course referred to, has been especially prominent in Louisiana forestry affairs for the last fifteen years. The degree of bachelor of science is granted for the course at the summer school. The Louisiana State University gives a fine course in forestry under its Department of Forestry which leads to a degree.

Maryland — The State Department of Forestry of Maryland was created in 1906. F. W. Besley, Baltimore, is the state forester.

The area of the state of Maryland is 6,362,240 acres, and its original forested area was 5,760,000 acres. The present forest area is 2,228,000 acres, and the idle or unproductive lands are supposed to be only about 350,000 acres. The state forests amount to 3835 acres. There are no national forests in the state. The state institutions and cities own 9400 acres.

Compared with other Southern states, or with any states in fact, Maryland has a very liberal forestry appropriation, the last previous one being $30,000.

Mississippi — Mississippi has no state forestry department. The Mississippi Agricultural and Mechanical College had a limited appropriation, but was forced to drop its organized forestry courses, and the only forestry taught in that institution is incidental to the department of botany.

The land area of Mississippi is 27,751,680 acres, and its original forest area amounted to 25,800,000 acres; its present forest area is 15,600,000 acres, and it has now 3,000,000 acres of cut-over lands. The state has no state nor national forests nor publicly owned forest area.

Mississippi has never had an appropriation for forestry; has no forest-fire protection system and no state nurseries. Its laws prohibit and punish careless and malicious setting of fires. Railroads have been made liable for fires along their rights of way.

On April 12, 1924, the state of Mississippi passed Senate Bill No 434, which made a step forward in forestry, but it is a very short and childish step, if it might be considered a step at all.

If this new law of Mississippi is just something to shoot at by those friendly to forestry, it ought very soon to look like an old-fashioned colander.

The law provides for ten years' exemption on growing a crop of trees, during which time the land is assessed as cut-over lands are generally assessed; after that period, chaos, so far as this bill provides.

The Mississippi law has not been generally printed and distributed, and the writer is indebted to Frank G. Wisner of Laurel, Miss., president of the National Lumber Manufacturers' Association, for the text of the law, which, presumably, had to be copied from a book, very likely the official records at Jackson. Evidently, Mississippi is not especially impressed with its new forestry law, at least not to the extent of giving it wide publicity.

Take it all in all, Mississippi looks like a very good field in which the forestry evangelist might, with profit, preach his gospel.

Missouri — Missouri has no state forestry department, but it has a most active and effective forest association, which was organized in December, 1921, "to advance the public understanding of the importance of timber crops in the economic life of local communities and the whole state and nation, so that due provision will be made for insuring, particularly within the state of Missouri, a proper area of forest so maintained and cared for as to furnish the supply of timber for future needs, and to make available all the other benefits of health, pleasure and profit that the forests afford."

So it seems Missouri proposes to regulate its own state forestry affairs and to help regulate those of the nation as well; an ambitious paternalism well worthy of an association of which Dr. Herman von Schrenk is president; W. P. Gruner, treasurer, and Frederick Dunlap, a technical forester of Columbia, Mo., is secretary. More power to Missouri!

The land area of Missouri is 43,985,280 acres; original forest area was 32,000,000 acres; the present forest area is 16,800,000 acres; unproductive forest land 100,000 acres.

There are no state or national forests within Missouri, but there are 50,000 acres owned by state institutions or under Federal land grants.

There has never been an annual appropriation for forestry by the state, and no state forest fire protection system, but the local authorities are active in making the railroads liable for fire along their rights of way. There are no state nurseries and no special forest taxation laws, and so, with all this lack of activity and the supposed forest area of 16,800,000 acres, there is plenty of opportunity for the very active Missouri Forestry Association.

St. Louis, Mo., is the home of the Concatenated Order of Hoo-Hoo, the active fraternity devoted to the interests of friendly co-operation among all lumber peoples. At its annual meeting, held in Minneapolis this year, the order dedicated its present and future to the encouragement of the practice of forestry, and its present chief officer, J. H. Allen of St. Louis, whose euphonious title is Snark of the Universe and who is an active lumberman and himself at the head of a 200,000-acre forest reproduction enterprise in Arkansas, is out in a program of reforestation backed with the 9000 members of his fraternity, 65 per cent of whom reside in the sixteen Southern states comprehended in this review, which program he outlines in fifteen suggestions as follows:

"1. Any person, firm or corporation owning second-

growth short-leaf yellow pine timber on lands in the localities designated (the localities to be selected by the Forest Service), and who are desirous of creating out of said lands a timber farm, may do so by complying with this act.

"2. The lands owned must be located in states where cut-over lands may be excluded from taxes for periods of 25 or 50 years.

"3. Persons, firms or corporations offering lands to the government under this act must have good and valid titles, and property must be clear of incumbrance.

"4. When lands are offered they are to be cruised and classified by the United States Forest Service into two grades, No. 1 and No. 2.

"5. If lands are accepted by the Government, and classifications are mutually acceptable, then the owner is to convey the land in fee to the Government of the United States.

"6. The Government will issue to the vendor a timber certificate showing the vendor is interested in the timber on the lands conveyed: first, in lands classified first grade to the extent of $5 per acre, prior to the Government's interest, and in lands that classify second grade $2.50 per acre, to be the price to the Government; second, the certificate will have coupons for 50 years attached, which shall equal 20 cents per year per acre on Class No. 1 lands and 10 cents per acre on certificates covering Class No. 2 lands, coupons payable to vendor or his assigns.

"7. An agreement is to be executed between the vendor and the Government setting out that the fee passes to the Government for 25 or 50 years. In the event either party should desire to sell and market the stumpage on and after 25 years, it could be done, provided the timber could be sold at the market price at that time.

"8. The Federal judge in the district where timber is offered for sale shall ascertain and determine the market value of timber to be approved and acceptable to the Chief of the United States Forest Service, and also to the President of the United States of America and the original vendor.

"9. As any given piece of timber is sold, the first moneys to be paid is to the landowner. If it is Class No. 1 land sold, the original vendor shall receive $5 per acre; if second-class land, he is to receive $2.50 per acre.

"10. After payments have been made under paragraph 9, then all proceeds derived from sale of timber from said lands shall be divided equally between the original vendor and the Government of the United States.

"11. The certificate issued is to act as a future timber license.

"12. The coupons issued by the Government to vendors is part consideration for the land.

"13. The one-half interest coming to the Government out of the sale of timber is the rental feature of the timber certificate or license issued.

"14. The prior claim of $5 per acre on Class No. 1 and $2.50 per acre on Class No. 2 lands is the remainder of the purchase price due the vendor for the fee to the land he has conveyed to the Governmnt.

"15. After 50 years the vendors or their assigns, or the Government, either, may sell the timber at the market price. This market price to be determined as above outlined."

This is the organization whose principles are much more serious than its whimsical name suggests, which last spring started a movement of tree planting in the whole country in connection with the Boy Scouts of America which resulted in the planting of 60,000 trees in the three states of Missouri, Indiana and Michigan, and which this coming year will be actively carried out in all the sixteen Southern states.

North Carolina — North Carolina has a state forester, J. S. Holmes, at Chapel Hill, working, the writer believes, with the North Carolina Geological and Economic Survey, created in 1905.

North Carolina has a very active forestry association, organized in 1911, which was organized following a forestry convention which met at Raleigh on the initiative of Dr. Joseph Hyde Pratt, who was then state geologist, and organized, too, on the very same basis: "To promote the protection of the forests of North Carolina from fire and destructive insects and to promote their perpetuation by wise use and by the reforestation of cut-over and abandoned lands." Frank W. Cox of Washington, N. C., is president, and John L. Cobbs, jr., of Wilmington, N. C., secretary.

It was in North Carolina that the first Southern Forestry Congress was called by Dr. Joseph Hyde Pratt, which met in Asheville, N. C., in July, 1916, in which the North Carolina Geological and economic Survey, the American Forestry Association and the Society of American Foresters took part.

This congress has met annually since that time, and at its last meeting in 1924 J. S. Holmes, state forester of North Carolina, was elected president, and C. B. Harmon, secretary of the Southern Sash, Door and Millwork Association, Atlanta, Ga., secretary.

The next annual meeting of this body will be held in Little Rock, Ark., in January, 1925.

The land area of North Carolina is 31,900,000 acres; the original forest area 31,000,000 acres; the present forest area 21,130,000 acres and the idle forest land 4,220,000 acres.

There are no state forests in North Carolina, and the national forests in the state contain 348,319 acres. There are in North Carolina state parks, state institutions and swamp lands, which total 126,035 acres. The last annual appropriation for forestry in North Carolina was $24,000.

The forest fire laws of North Carolina are supposed to be very adequate, but the appropriation to administer them has been very inadequate. There are no special forest taxation laws in North Carolina, and there are no state nurseries.

Oklahoma — Oklahoma is one of the youngest of the Southern states in this review, yet it has just about the beginning of every necessary thing in forestry. The land area of Oklahoma is 44,424,960 acres and its original forest area 16,896,000 acres; its present forest area 8,800,000 acres, and its cut-over land 1,450,000 acres.

Oklahoma has a national forest of 61,480 acres, but no state forests; has 16,000 acres of game preserves, and is supposed to consume nearly three times as much lumber as it makes, which indicates that the relative manufacture of lumber in Oklahoma as compared with the other fifteen states is quite small.

There is no definite forest-fire protection law in Oklahoma other than a statute made and enforced against the railroad companies for damage done on their rights of way. There are no forest-taxation laws and no state nurseries.

The Agricultural and Mechanical College of Oklahoma has a forestry department which gives courses in forestry, conducts forest extension work and experiments in tree planting. Christian Jensen is at the head of the forestry department of the Agricultural and Mechanical College at Stillwater, Okla., and is also secretary of the Oklahoma Forestry Association.

The association was formed in 1921, and, besides Mr. Jensen, W. S. Guthrie of Oklahoma City is president and W. A. Etherton, Stillwater, Okla., treasurer.

South Carolina — Clemson Agricultural College of South Carolina has items of silviculture, forest management, artificial and natural reforestation, mensuration and wood utilization, lumbering, wood preservation, forest economics and forest finance in its curriculum, which course is required of all sophomores.

The land area of South Carolina is 19,516,800 acres, of which 17,920,000 acres was originally forests, and the present forest area is 12,600,000 acres and the idle lands 1,900,000 acres.

The production of lumber in South Carolina will increase rather than diminish during the next several years commensurate with the advance in logging methods, as it appears that much of the timber of South Carolina is not normally located as to availability, indicated by the relativity of its present forest area, to its original forest area. The writer has not been able to find that South Carolina ever had a forestry association, forest-tax laws, fire-protection laws or state nurseries.

Tennessee — The citizens of Tennessee are very much alive in matters of forestry.

The Tennessee Forestry Association was organized in Nashville November, 1918; has a few less than 100 active members, and its present officers are Major Rutledge Smith, president, and Rufus S. Maddox, state forester of Tennessee at Nashville, secretary.

The amount set aside for the use of forestry in Tennessee at the last previous annual appropriation amounted to $11,800.

Tennessee has much available stumpage, some of it pretty difficult of access. The national forests within the state of Tennessee equal 241,210 acres, and other publicly owned forest areas aggregate 25,000 acres of forests, held by state institutions.

The bulk of the production of lumber in Tennessee is, of course, hardwoods, and in feet, measuring foot for foot against consumption, Tennessee consumes nearly as much lumber as it makes. Tennessee has quite elaborate forest-fire laws, lacking public co-operation and lacking appropriation

to help enforce. There are no special forest-taxation laws in Tennessee and no state forest nurseries.

The land area of Tennessee is 26,894,000 acres, and the original forest area was 25,600,000 acres, the present forest area being estimated at 9,000,000 acres.

Texas — The Agricultural and Mechanical College of Texas, at College Station, has elective courses in silviculture, and the principles of forestry are taught there by E. O. Siecke, professor of forestry of that institution and state forester of Texas.

Texas has yet a great lumbering future, for while its forested area, in proportion to its total area, is smaller than most of the sixteen Southern states, it must be remembered that Texas contains 170,173,000 acres and the original forested area was 48,000,000 acres, and is yet supposed to be 33,000,000 acres. The state contains 4,000,000 acres that might be subject to reforestation.

The last previous annual appropriation for forestry in Texas amounted to $39,600, quite a liberal sum, as compared with some other Southern states. But while Texas has no special forest-taxation laws, it has a quite ambitious program of forest-fire laws in co-operation with the Federal Government, which cover a patrol district of about 300,000 acres. The Texas Forestry Association is a very active quantity Richard F. Burges, El Paso, is president; W. Goodrich Jones of Waco, president emeritus, the vice-presidents being R. A. Gilliam, Dallas; J. Lewis Thompson, Houston; Mrs. Lee Joseph, San Antonio; Watson Walker of the Southern Pine Lumber Company at Diboll, and E. O. Siecke, secretary-treasurer.

Virginia — The state of Virginia has a state forester, Chapin Jones, located in Charlottesville, Va., his office being under the Virginia Geological Commission, created in 1914. The land area of Virginia is 25,767,680 acres, the original forested area 24,960,000 acres, and the present forest area over half of that amount even yet, this area being credited with 13,800,000 acres.

Virginia has a comparatively small amount of waste land when compared with other states—only 1,500,000 acres, not all of this by any means being cut-over forest lands.

There are only 588 acres of state forests in Virginia, but Virginia contains 332,106 acres of national forests within her borders.

The average yearly consumption of lumber in Virginia is easily double what the state produces.

The last previous appropriation by the state for forestry purposes in Virginia was $18,000, ending with February of this year.

There are no special forest-taxation laws in Virginia, the forests being taxed as other real estate.

The forest-fire laws provide penitentiary sentence for malicious setting of fires to woods, grasses, etc., and there are fines for negligence in burning brush or failing to keep premises of steam mills in woodlands free from rubbish, etc., and forest-fire wardens are appointed to administer these affairs, under the direction of the state forester.

One nursery is maintained on the grounds of the University of Virginia, from which trees are distributed.

The law creating the forester of Virginia and prescribing his duties indicates he is a very busy man.

West Virginia — West Virginia is a very active hardwood lumber producing state, and will be for many years to come. Just what West Virginia may do in the way of reforestation is a problem, and it has not been considered as much as it should have been, probably because the land area of the state, consisting of 15,374,080 acres, contained also 15,360,000 forested acres, the present forest area containing 9,500,000 acres, and there is only 1,000,000 acres of forest lands idle or unproductive.

Up to September 25, 1924, the national forests within the state amounted to 132,108 acres, to which have since been added 13,000 acres by the Government.

There is no forestry department in West Virginia, but the forestry affairs are taken care of by the State Game and Fish Commission, the forestry official being A. B. Brooks, chief game protector, living at Buckhannon, Va.

All the appropriation for forestry comes from the Game and Fish Commission funds. There are no forest-taxation laws in West Virginia and no state forest nurseries, but the Federal Government has a nursery at Gladwin to grow stock for the national forest area in the state.

There is quite an increased interest in forest-fire protection by an association of forest landowners, who pay an assessment of one cent an acre in a common fund in the protection of 1,250,000 acres. This amount is duplicated by the state funds, derived from a portion of the hunters' license fees.

The state of West Virginia receives $10,500 from the Government under the Weeks law.

Hardwoods in the Southern United States

Even the Government of the United States is very slow to give out information regarding the supply of hardwoods in any locality.

The "Forestry Almanac" does one queer thing in connection with its statistical pages when it does not assume to give the state of Virginia credit for having any timber stand whatever. It is time for our readers right now to know that there is a hole in Southern timberlands calculations amounting to whatever are the number of feet of standing timber in Virginia. It would be worse than folly to guess at it, even if the figures were approximately true, and we make this statement while at the same time we feel that no person now treading the earth will ever know whether the guess at the amount of standing timber in Virginia might or might not have come out all right in the end, for no one now living will be upon the earth when Virginia ceases to produce hardwood lumber each year.

Now, one of the main reasons for this statement is that the life of the hardwood production of this country is a complex problem that nobody ever undertook to solve. Even when it comes to production, that is a difficult problem, for the only possible sources of information at all reliable would be the Southern Pine Association members, now getting a little bit into hardwoods; the Southern Cypress Manufacturers' Association, whose members are cutting gum and such like; the Northern Hemlock and Hardwood Manufacturers' Association, the National Hardwood Lumber Association and the Indiana Hardwood Lumber Association memberships, many individuals of which associations have direct and remote timberland and sawmilling connections in the South; and last, and most important in this connection, the Hardwood Manufacturers' Institute, the bulk of whose member mills are in the Southern country.

Even after all the information the bodies mentioned might furnish to the statistician, the great bulk of hardwood production in the United States would yet be outside the record, for not one hardwood producing plant in ten in the whole country has affiliated itself with any of the so-called hardwood lumber associations or is named as an item in any list of hardwood manufacturers in an independent way.

Seventy-five per cent of the hardwood timber of the United States available for manufacture is supposed to exist in the sixteen Southern states, and if Southern timber history repeats Northern timber history, the hardwood industry of the South will go on for ages to come.

Neither the careful observer nor the statistician would look upon the states of Ohio and Indiana as being worthwhile hardwood producers, yet a little while ago a concern which had already been making lumber in Cleveland for seventy-five years purchased a valuable block of suburban property and built thereon a great hardwood lumber production plant just on the strength of the known fact that it could easily pick up from the farmers in northern Ohio enough hardwood timber to keep the plant running for fifty years.

There is a sawmill site down in central Indiana, only two or three hours' ride from Indianapolis, where the grandfather of the present owner had a sawmill and where the present owner has worn out a fine hardwood producing plant in the last thirty-five years, and upon which site the news of early September carried the statement that this dyed-in-the-wool producer was erecting a fine new band mill, where he contemplates cutting hardwoods during this and the next generation. He will get his timber in Indiana.

Now, with all these things going on in the North, where hardwood trees are picked up in lots of from six to a dozen from farmers, the owners of hardwood lands in the South ought to consider themselves in fine hardwood producing condition for many years to come.

It is still practical in some portions of the South to take the saw to the trees, instead of the trees to the mill, in the case of hardwoods, and even if that was not true, our friend—a nationally known investigator of such questions and problems, who sent us the query, "Are hardwood values likely to increase in the near future at a rate beyond reasonable carrying charges?"—ought to secure much comfort from the fact that a great movement is being instituted among hardwood manufacturers in the way of establishing a new method of manufacture which contemplates cutting out the good parts of the hardwood boards for "cutting-up stock" and leaving the useless portions at the plant for the refuse burner, which guarantees that the hardwood product will never have to be marketed "at a rate beyond reasonable carrying charges."

Adventures in Timberland Growth and Southern Pine Timber Stand

The Southern Pine Association, considered to be the largest commercial association in the United States in any line of business, when looked at from the standpoint of its activities and amount of money spent in securing statistical information and trade extension, never has been satisfied with any existing statistics in regard to the stand of Southern pine timber, and has recently been, in its own way, gathering direct "timber stand" information in every Southern pine-bearing timberland county or parish of the Southern United States, compiling these statistics by direct work of a corps of men employed for that purpose alone, the investigation in the hands of an expert statistician, who for a similar purpose covered the same territory four years ago.

This work is not finished and may or may not be given to the world when it is finished, but we are privileged to quote from the "Long Leaf Letter," a monthly message sent out to the friends of the Industrial Lumber Co. of Elizabeth, La., under the direction of Robert M. Hallowell, one of the best known and most successful yellow pine producers in this country, who says in his "Long Leaf Letter" for September:

> "Mr. Dunham is now completing a survey for the Southern Pine Association. His report will show an annual cut of Southern pine as 15,000,000,000 feet, and the annual growth as 7,000,000,000 feet. He makes the statement that the production (cut) of Southern pine will never fall below 7,000,000,000 feet."

Before Many Years the South Will Consume All Its Pine Lumber

When one has considered the lumber production of these sixteen Southern states, that, really, is only one item of the evidences of prosperity for the entire South in its timberland future.

There remains the great matter of naval stores, the traditional "tar, pitch and turpentine," staves, headings, hoops, box shooks, railway ties, telegraph poles and the like, the whole category forming such an interesting picture for the great commercial South that makes it certain the South will not forget its duty in the present, when it comes to appreciate how surely that will assure its prosperity in the future, in all matters of commerce, contemplated in the question of tree production, in the soil best fitted to tree production, in the known world.

Reforestation is necessary and obligatory, and should be. It may yet be made compulsory, some think, in some of the states of the South which have not yet seen the light; but in this connection the writer does not contemplate any such probability.

The South has already, in many states, the necessary machinery of forestry associations, forestry operation by states, co-operation with the forest service of the United States, and may rest assured that with even the most ordinary help which may be given to the artificial growth of timber in the South the production of lumber and all of the products mentioned will last for many generations yet to come. And, if the statement may be any comfort to other lumber and timber production sections of this country now in competition with the South, let it be known here and now that the general prosperity of the South itself will in a few years practically consume all of the soft-lumber items in the list mentioned; but its hardwood will continue to be shipped all over the world.

The Furniture Industry

High Point, N. C., is second only to Grand Rapids as a furniture manufacturing center. Started originally by local men and its development continued by local men and local capital, the High Point furniture industry is probably the most thoroughly localized business in capital and management of any large industry in the South. It is one of the best illustrations that could be given of development or growth from within and by the hearty encouragement of local people. To a large extent the capital invested is local, the management of the many furniture factories in this vicinity is local and the employes in this industry are local, but the product is shipped as far West as the Pacific Coast and far in the opposite direction, reaching to Africa.

A few years ago a million-dollar fireproof Exposition Building was erected at High Point for the express purpose of displaying in annual expositions the product of the furniture factories of that town and the surrounding territory, but this industry is by no means confined to High Point. It is active in many other parts of the South.

Some years ago there were two tobacco factories in Martinsville, Va., which were sold to a tobacco combination. One of the sellers, feeling that the elimination of the tobacco interest would destroy any possibility for constructive work in the upbuilding of the town, decided to move elsewhere. Before he made the move, however, he heard the celebrated lecture, "Acres of Diamonds," by Dr. Russell H. Conwell of Philadelphia, a lecture which has been delivered over 6000 times. In this lecture Dr. Conwell tries to stir the imagination and activity of people to find in their own communities opportunities for business and for fortunes. This lecture turned the tide with one of these Martinsville men and he decided to build a furniture factory, and that has grown and kept on growing, until he recently completed the fourteenth building in his plant, having expanded from year to year in accordance with the growth of his business.

In Mebane, N. C., there has recently been built a $500,000 furniture factory to take the place of one burned some months ago, and this concern when put in competition for hotel furniture against some of the greatest furniture making concerns in America has often won out. In other parts of Carolina furniture factories, chair factories and kindred activities have developed to a greater extent than elsewhere in the South, and North Carolina has become almost as noted for its furniture industry as for its cotton-mill business.

But this industry is not confined to that state nor to Virginia. At Fort Smith, Ark., there has long been a

thriving furniture-making business, which, finding its raw material in the abundant forests of that state, has resulted in the development of an industry operating many factories and adding largely to the prosperity of the community. For this industry the South is well suited. It has the hardwoods and the labor necesary for continued expansion.

The number of furniture manufacturing establishments in the South practically doubled in twenty years, increasing from 262 in 1899 to 436 in 1919. During this period the amount of capital invested in the industry increased over 300 per cent. The value of products of the South's furniture manufacturing industry in 1919 was $91,600,000, compared with $15,592,000 in 1900, an increase of 487 per cent, or $12,000,000 more than the value of the products of all the furniture factories in the United States in 1880.

There are many other lines of woodworking in the South where the finished product of the sawmill becomes the raw material for the planing mill and other woodworking interests, and the aggregation of the furniture and the general woodworking interests of the South is becoming one of the outstanding features of the industrial activities of this section. Today Southern-made furniture is known as the standard for quality and workmanship.

The Naval Stores Industry of the South

By Thomas Gamble, Editor Weekly Naval Stores Review, Savannah, Ga.

The South's crop of naval stores, that is, spirits turpentine and rosins, produced on over fifteen hundred so-called "turpentine farms," extending from North Carolina to Texas, and including eight Southern states in the territory worked, is expected for the present season to be approximately 520,000 barrels of spirits turpentine, of 50 gallons each, and 1,720,000 barrels of rosin, averaging 500 pounds gross weight. Reduced to a basis of net pounds, this would mean a total production of 182,000,000 pounds of spirits turpentine and 722,000,000 pounds of actual rosin. The aggregate value of the crop is estimated at $40,000,000 at the primary market quotations. The present crop is reduced by about 22 per cent compared with the average production for the seven years preceding the World War. The greatest production for any season, the tremendous crop of 1908-09, was estimated by the trade at 750,000 barrels spirits turpentine and 2,500,000 barrels rosin, so the crop of 1924-25 promises to be about 30 per cent below the maximum production. That maximum can never be reached again. The sources of supplies have been largely wiped out in the wholesale destruction of the pine forests. The premier crop of 1908-09, however, had a market valuation less than that of the decreased crop of this season.

In North Carolina, for many years the headquarters of the industry, production is now reduced to a negligible point. Wilmington has even ceased to keep port statistics as to such commodities. South Carolina has had a recrudescence of the industry in the past two or three years through the working of the new growth of timber, in the absence of any intelligent effort to protect and perpetuate the source of supplies the revived life promises to be of short duration. Georgia and Florida for the past twenty years have been the mainstay of the industry and continue so. Probably over 60 per cent of the production of 1924-25 will come from these two states, and 35 per cent from Alabama, Mississippi, Louisiana and Texas. The number of turpentine operators last reported for the several states was: North Carolina, 11; South Carolina, 62; Georgia, 725; Florida, 500; Alabama, 225; Mississippi, 37; Louisiana, 17; Texas, 6. In the Southwest the individual operations are on a very much larger scale than in the Eastern territory, as a rule.

Those who have traveled the South at intervals in the past quarter-century have keenly realized the rapid disappearance of the vast pine forests that once were a seemingly fixed and irremovable feature of the landscape. The Forest Service has estimated that inside of the next ten years what remains of the original growth of pines will have been turpentined and saw-milled, and the South, and the country as a whole, left dependent on the new growth whose origin dates back twenty-five or thirty years. Fortunately, a new sentiment has sprung up in the last few years through education and the spreading of more exact knowledge as to actual conditions, and there is apparent today on every state a growing impulse for the protection of the young pines. The desire to assist nature in her efforts to replant the cut-over areas is assuming sufficient proportions to justify legislatures in acknowledging such needs and co-operating with the forward-looking men and women who are seeking proper laws. Appropriate legislation has been secured in two or three states, and is being sought in others, to lessen fire losses and to establish a tax system that will encourage holders of large cut-over areas to reforest them, either by artificial planting or by protecting natural reforestation. Studies of the slash pine have shown that it is not a matter of generations, as once popularly supposed, to produce a tree that can be made profitable, and that investments in land on which young growths of these and long-leaf pines are coming on bid fair to be highly and permanently profitable. Twenty years of growth brings the slash pines to a maturity that permits of reasonable turpentining, and the adoption of a modified French system of working, it has been demonstrated, will not only convert such trees into a source of immediate remunerative returns, but will permit of their continued growth into highly valuable timber at the same time. The return of Georgia to first rank this season as a naval-stores state is due to the working of trees which have come up since 1900 and, almost without protection, have recovered the land held for centuries by their forebears. Great sections of the state possess today a vigorous growth of young pines that, with moderate care, will develop in a comparatively few years into prolific yielders of the oleo-resin from which spirits turpentine and rosin are made. All that is needed to foster natural reforestation on a large scale is intelligent legislation that will permit heavy investments of capital without excessive taxation during the inevitable non-profit years of growth of the immature pines. This will probably be obtained in Georgia from the recently elected legislators. Florida, likewise, offers similar inducements to syndicates and other large investors to become the turpentine and timber producers of two decades hence. In Alabama, Mississippi, Louisiana and Texas large lumber companies, in some notable instances, are already reforesting many thousands of acres for the perpetuation of their

own industries, the production of naval stores being a preliminary and secondary object, as a rule.

The demand for naval stores is world-wide, especially for rosins, the calls for that commodity last season and this having exceeded production and consumed considerable of the accumulated surplus of the previous two or three years of unsettled foreign industrial conditions and resulting diminished exports. The position of rosins in various important industries is firmly established. The swelling tide of foreign requirements has been one of the outstanding and astounding features of the trade in 1923 and 1924. For the first six months of this season, that is, April-September, the shipments abroad have been 786,003 barrels (500 pounds each), against 602,801 for the same months last year, an increase of 30 per cent. In 1922 for these six months the exports were 429,277 barrels, or but 47 per cent of the movement for April-September of this season. Only recently, in the closing days of October, Savannah saw, for the first time since the World War, seven steamships in port taking on rosins. Thirty thousand barrels were rolled out on the wharves at one time for shipment, a vivid illustration herewith showing the scene of activity. Every naval-stores port has seen a somewhat similar activity. Month after month the statistics of exports have revealed the same rapid expansion in the demands of the United Kingdom, Germany, South America, the East Indies and other consuming parts of the globe. The rosin trade is world-wide in its scope. Hardly a country but imports rosin in some measure. To the vast manufactories of the Rhine district, the far away varnish and cotton-printing plants of the Dutch East Indies, the small soap plants of China, the paper mills of Japan and the soap industry that the World War brought into being or expanded in progressive South American countries full cargoes or moderate shipments of rosins move in a constant stream. On an average for every day, except Sundays, since the present naval-stores season began on April 1, five thousand barrels of rosins have been shipped from the United States.

New uses develop from time to time in this and other countries, and students of the commodity in its relation to industrial activities predict that current research work will develop hitherto unsuspected rosin qualities and values. More than ever it is essential that the forests of the South should be perpetuated as a source of contribution to the world's material welfare and of employment and wealth to its own people. As regards spirits turpentine, the situation has been less favorable, owing to the development of varnishes or lacquers, now being used in increasing quantities in our own and other countries, into which turpentine does not enter and the improved naphtha substitutes that have apparently so largely driven it from paints. Recent steps by the producing and factorage elements to institute scientific research work may bring about new outlets for turpentine as well as rosin by demonstrating hitherto unrecognized or merely suspected superiorities and creating new uses now undreamed of. Just as the neglected cottonseed has magnified its uses and values in recent years, so rosin has gradually passed into a hundred channels of service since the days when it was deemed an incumbrance and run into creeks and low places as an unsalable waste product of spirits turpentine. It may even now be on the verge of new discoveries that will enhance its value and importance and insure a demand for every pound that can be produced. When one new use alone in 1924 has called for 30,000 barrels, and another great manufacturing concern states that it has established three new purposes for which it can be utilized in its plants inside of the past twelve months, its position would seem fixed and the duty becomes even more imperative on Southern legislators to protect and promote by every lawful means the reforestation of denuded lands that agriculture does not require and that, in any event, would be more permanently profitable given over to the pine tree and its products.

Phosphate Rock Resources of the South

THE GOVERNMENT now has two extensive phosphate reserves, one in Florida and the other in the Western states. A total of 122,816 acres of phosphate land has been reserved in Florida and 2,305,000 acres in the West.

PHOSPHATE RESOURCES
(Tons)

States	Estimated quantity at end of 1915	Approximate quantity mined 1916-1922	Estimated quantity available
Arkansas	20,000,000	.....	20,000,000
Florida	227,000,000	15,000,000	212,000,000
Kentucky	1,000,000	100,000	900,000
South Carolina	9,000,000	200,000	8,800,000
Tennessee ...	88,000,000	3,000,000	85,000,000
Total....	345,000,000	18,300,000	326,700,000
United States.	5,829,098,000	18,406,000	5,810,692,000

ROSIN ROLLED OUT FOR FOREIGN SHIPMENT AT SAVANNAH, GA.

Refrigeration One of the Ten Largest Industries of the Country

The Outcome of a Southern Invention of Ice Making Which Has Revolutionized Civilization

By Terry Mitchell, Waynesboro, Pa.

Ice cream, now made in almost every home in the land, was originally a mysterious thing, produced by a secret process. It is said that Jacob Fussell of Baltimore, who was the first man to make ice cream as a business, shortly before the war of 1861, refused a large sum of money from a Brazilian concern which wished to use his recipes and methods in South America.

Terry Mitchell

The same atmosphere of mystery has always clung to the art of refrigeration by artificial methods. The housewife who buys ice every summer little understands the wonderful process used in making the crystal blocks; men with money invested in cold-storage plants do not know through what means they earn their profits. The story of the South's development would not be so inspiring had not its leading scientists early given their efforts to the building of practical refrigerating machines, laying the foundation for the great refrigeration industry of today.

Before describing some of the remarkable feats now being accomplished by the refrigerating engineers, the system on which mechanical refrigeration actually "works" will be touched upon for the benefit of those wanting to know the fundamentals upon which the whole industry is built.

If you want to boil water, you heat it over a fire. When the water reaches a temperature of 212 degrees, it turns into the vapor called steam. Some other liquids boil at a lower temperature; alcohol will vaporize at 173 degrees Fahrenheit. Ammonia, which is a clear liquid, looking similar to water, boils at a still lower temperature. In fact, when free from water (with which it is combined for household use), ammonia will vaporize at ordinary room temperature in a tumbler placed on a table, or even on a lump of ice. Pure liquid ammonia will boil at a temperature of 28 degrees below zero!

The heat of the fire went into the water, changing it to a vapor. In the same way, the warmth of the air goes into liquid ammonia, changing it to ammonia gas.

Suppose, now, we remove the ice from a refrigerator box and in its place put a long pipe, bent into a coil. If a little liquid ammonia is allowed to run into the pipe, the warmth of the air in the box will make the ammonia boil. By drawing off the ammonia gas from the pipe, we will take the heat out of the box and leave it colder than when we started.

The refrigerating machinery is arranged to do this, and also to change the ammonia gas back into liquid ammonia to be used over again. A gas pump or compressor is connected to the coil in the box, and this sucks out the vapor as fast as it is formed. Before the vapor leaves the cylinder of the compressor it is compressed to about 175 pounds. The vapor becomes quite hot in going through the compressor. It is next fed into pipes which are kept cool by having cold water run over them and known as the condenser. Here the hot gas is chilled and changed back into a liquid.

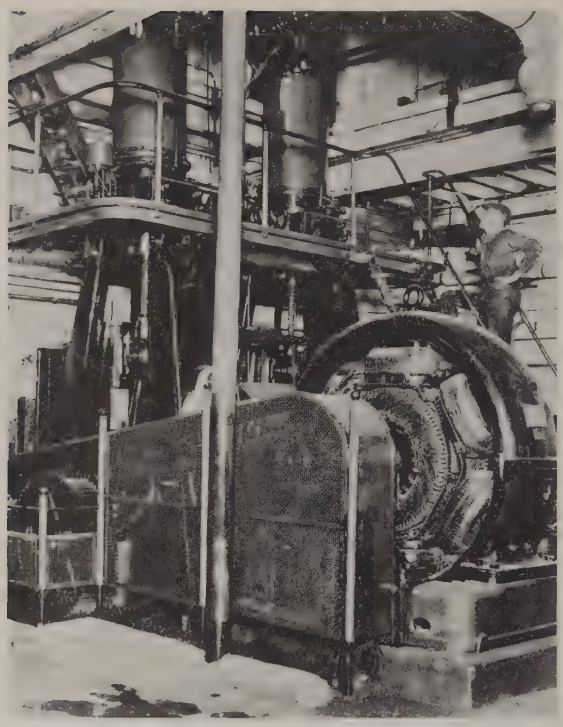
The liquid is collected in a strong iron tank, termed the receiver. A small pipe carries the liquid from the receiver back to the box coil. A special valve, called the expansion valve, is put in the small line to control the flow of liquid ammonia into the coil. By opening the expansion valve slightly the operator allows some of the ammonia to enter the coil, where it boils into a gas, absorbing heat and chilling his box and its contents as much as he desires. As the temperature drops lower and lower, the coils become so cold that they condense and freeze the moisture from the air as it circulates over them, producing white frost on the coils. The effect of this is to dry the air—a decided help in maintaining sanitation and keeping food in first-class condition.

This method of making "cold" mechanically is known as the ammonia compression system, and is the one most generally used today. Systems using air, ether, sulphur dioxide, carbon dioxide and other substances have all been tried, with varying degrees of success. It was with an air machine that the celebrated Southern inventor, Dr. John Gorrie of Florida, experimented in the early fifties. His apparatus is said to have produced successfully a small quantity of ice when demonstrated in a hotel at Apalachicola. In May, 1851, Dr. Gorrie took out the first patent in the United States for a refrigerating machine, his letters patent applying after August 22, 1850. A monument to his memory stands in the public square at Apalachicola, and a statue of the scientist is among those of other gifted men in the Hall of Fame at Washington, D. C. The South also claims honors for maintaining, in Georgia, one of the first factories for the manufacture of refrigerating machinery.

The vital part played by refrigeration in the development of industrial and social life in the Southern states can best be understood by a brief review of the varied uses of mechanical refrigeration. Some of the applications of the science are remarkable in their originality and in their excellent results.

Ice making has always been the main job of the refrigerating machine. As far back as 1865 ice was being made mechanically in San Antonio, Texas, by a Carre ammonia absorption machine. New Orleans early became America's center of interest in refrigeration, the machines of Bujac, Halden, Metz, and David Boyle, the sponsor of the compression system, being built there in the seventies. By 1883 ice plants were in operation in a dozen Southern cities, and a general movement had begun which increased their number so rapidly that in 1889 a meeting of ice manufacturers was called in Chattanooga to find means of reducing unfair competition in the ice trade. Out of this meeting grew two important institutions which have served the industry ever since—the Southern Ice Exchange and the magazine, "Ice and Refrigeration."

The late Col. W. J. Rushton was the leader of the Exchange from the first. His business career is typical of the growth of the industry he did so much to advance. Landing in Birmingham in 1881, when that city had a



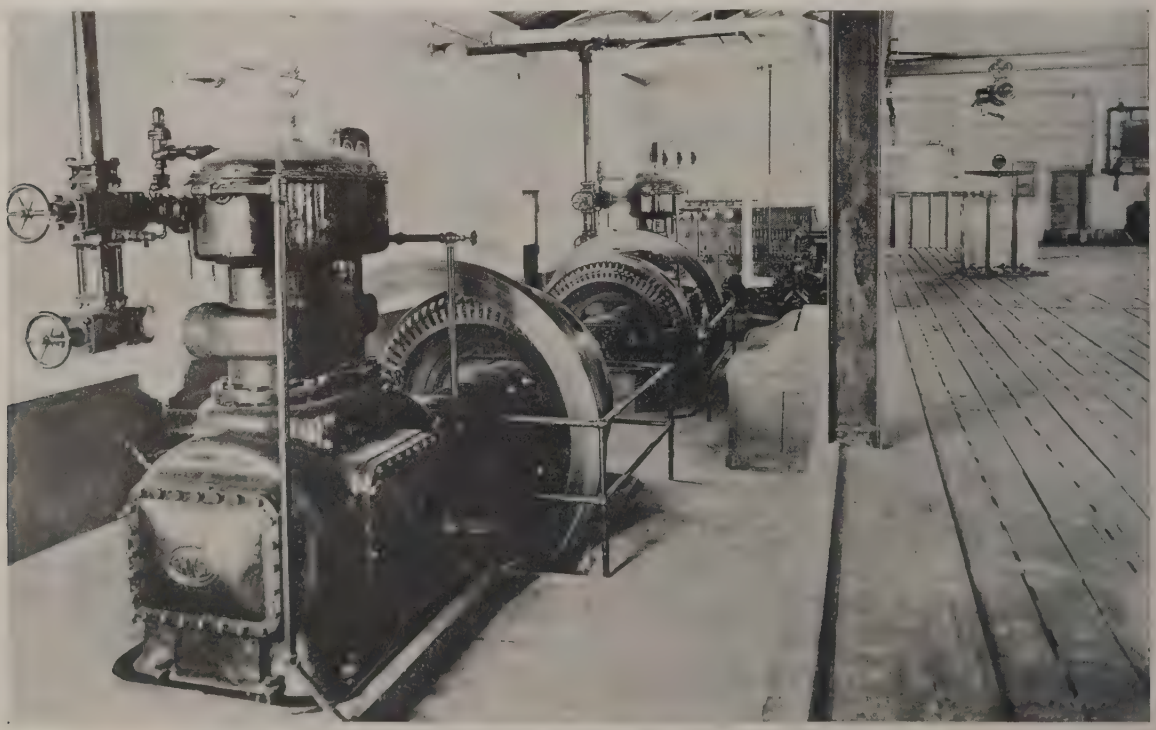
Refrigerating Machine Operating in Baltimore Since 1886—Motor Chain Drive Replaced Steam Engine in 1920

population of 3400, he started making ice with a 3-ton machine. By 1916 the Rushton plants in Birmingham had a capacity of 700 tons, with a 500,000-cubic-foot cold storage in addition. The South, stricken as it was after the war, was the first to take hold of mechanical refrigeration. As a means of preserving foods and advancing civilized life in scores of other ways, refrigeration has moved onward from the start given it by the thinking and working Southerners until today it is used in every part of the globe. American-made refrigerating machinery has been installed in more than thirty foreign countries. There are some fifty plants in India alone, supplying ice and

Ice Wagon in India—The Ice is Packed in Hay and Straw

cold storage facilities with American equipment. (The term "ton of refrigeration," used frequently in this article, is defined roughly as the cooling effect equal to that produced by the melting of a 2000-pound cake of ice in 24 hours.)

Those who invested in the original ice plants were often dismayed to find, when they got under way, that the ice produced was too muddy-looking and soft to be sold. Experiments showed that distilling the water was neces-



SYNCHRONOUS MOTORS DRIVING TWO COMPRESSORS IN A TEXAS ICE PLANT

sary, in order to drive out the air and other gases suspended in it, and that filtering through charcoal would remove the dirt which caused such badly discolored ice. From these factors the distilled-water ice-making system was developed, using for the ice cans the condensed steam from the engines which drove the refrigrating machines.

In the last fifteen years it has been found that clear, pure ice can be made from the same water which we drink without the trouble of boiling and condensing it. Some way of doing this had to be worked out when electric motors made steam power too expensive in comparison for driving the ammonia compressors and ready-made steam for distilled-water ice was no longer available. All that is necessary to make clear ice with the average city water is to run it through a sand filter, and then, while it is freezing in the cans, bubble up through it a stream of air. The air agitates the water violently enough to wash away from the surface of the ice the impurities which would otherwise freeze into the block and make it opaque. These impurities are taken out of the center of the ice cake just before it freezes solid, after which the core is filled with pure water.

Such improvements have kept the price of ice from increasing, though labor, material, taxes and distances the ice has to be delivered have steadily advanced. Natural ice shipped from the North in the old days cost three cents a pound in Tennessee, and was scarcely available in the extreme South. We find from statistics that the average price of delivered ice throughout the country is now 49.8 cents per 100 pounds. Ice is cheapest in Georgia, Tennessee and Louisiana. Twice as much ice is used per capita in Dallas as in Atlanta, the yearly amount in the former city being 2000 pounds. Texas has 345 ice plants. The average number for the Southern states is 130 plants for each state. Of the ice manufactured today, 60 per cent is made by the raw-water process, and the distilled-water plants are continually being changed over to the more economical system.

Before leaving the subject of ice making, the great service afforded the Southern farmers by the refrigerated railway cars should be mentioned. Chilled by means of ice, and handled by the organized refrigerated-car interests, these cars have made possible the wonderful fruit, dairy and produce farms which supply the larger cities with fresh foodstuffs the year round. In 1923 the cars of the Fruit Growers' Express alone are said to have used over 1,000,000 tons of ice.

It came as a surprise to many that ice cream as much as bottled drinks took the place of beer when prohibition went into effect. The tremendous growth of the ice-cream plants has called for more and more refrigeration, some of the finest refrigerating systems in existence now being employed for ice-cream making. A number of the breweries have turned misfortune into success by enlarging their refrigerating equipment and going into business afresh as ice or ice-cream plants, cold-storage houses or creameries —another instance of the value of refrigeration to industry.

When you start out for the day, do you realize that your clothes as well as your breakfast were made with the help of mechanical refrigeration? The leather of your shoes is doubtless of good quality because it was properly chilled before and during the tanning process; the shoe polish which keeps them bright was suddenly cooled from a warm temperature, during manufacture (the process is a secret and applies to certain polishes only), by a refrigerating machine. Silk and mercerized cotton are preferably produced throughout the year at temperatures between 32 and 45 degrees; collars sent to the modern laundry are dried in a refrigerated box held at 20 degrees F. instead of in a hot room, with the result that they come out pure white, will not crack, and need none of the bleaching which formerly injured the fabric; woolens are non-shrinkable when made in cool, damp air supplied by a refrigerating system. Even felt hats, of the better grade, are kept under refrigeration overnight at the factory while they are wet and the weather is warm. The manufacturers of Ivory soap use hundreds of tons of refrigeration constantly; perfumes and dyes depend upon the same means for economical production. The bacon on your breakfast table was likely as not sliced by a machine after being partly frozen mechanically, the knives making a faster, cleaner cut when the meat is in this condition. Your milk was quickly chilled to 40 degrees F. after pasteurization to keep it sweet; your cereal and bread were made with the help of refrigeration;

RAW WATER ICE TANK INSTALLATION IN A WEST VIRGINIA ICE PLANT

butter and eggs cannot be shipped without being refrigerated. But for this art fresh fruits could not be on every table whenever desired.

If you smoke tobacco, you will be interested to know that its aroma was preserved while curing by careful control of temperature, and its price kept as low as it is by preventing loss from the tobacco weevil when stored, both through the help of refrigerating machines. The illustrations in the morning paper were made on films created under refrigeration. Scientific cooling was applied at the beginning and end of the process which produced most of the white paper you see. Inks, especially colored inks, could not be made cheaply without mechanical refrigeration to control the temperature of the coal tar products and other coloring materials. Thirty large glue factories in the United States utilize these machines to cool their product after boiling and filtering.

Our soldiers in the World War little stopped to think that the terrific heat of the explosives furnished had been incorporated in them under low temperatures, the duPont Company, for instance, using about seventy-five refrigerating machines in their work with nitroglycerine, dynamite, smokeless powder and other high explosives. Refrigeration helped to win the war in many army camps, transport ships, and hospitals also.

The chemical industries in general, including over a hundred laboratories, are large users of artificial cooling methods. Hydrogen for balloons and oxygen for all purposes are most easily obtained by the evaporation of liquid air, which itself requires a temperature of 321 degrees below zero for this work. The growth and preservation of yeast is so linked up with correct cooling that one well-known company employs more than eighty refrigerating machines.

A daring use has been made of this science in the sinking of shafts through quicksand and soil where the leakage of water cannot be overcome by pumps. A number of tubes, arranged in a circle, are forced down into the soil, and zero brine is circulated through each of these by means of inside pipes. The loose soil and water are gradually frozen into a circular wall which permits the shaft to be dug in its center. Mine shafts have been sunk by this method to the tremendous depth of 720 feet.

Other highly specialized uses of refrigeration are the loosening of glass lenses from the pitch or glue, in which they are held while being ground, by chilling and shrinking the soft material; the preservation of the pancreas necessary for the extraction of insulin, the recently discovered cure for diabetes; and the control of silk-worm development to correspond with the natural growth of the mulberry leaves, upon which the silk worms feed. The cocoons are held at about 32 degrees F., as severe a temperature as this may seem. Thanks to refrigerated ships, meat is successfully transported from Australia and the Argentine to England, and frozen reindeer meat is now brought to us from Alaska.

To what are refrigerating engineers pointing as the probable future of this many-sided industry?

The ice manufactured per capita in 1904 was estimated at 240 pounds; the figure increased to 664 pounds last year. The expected consumption of ice by 1940 approaches a thousand pounds per person, involving a heavy increase in ice-making facilities. With the constant growth of the cities, refrigeration for railway cars will be more vital than ever as the demand for fresh milk, fruit, vegetables and meats develops. This service will require greater and greater quantities of ice, unless a practical refrigerating machine can be built which will be part of the equipment of the refrigerator car itself. The writer believes that when the railways become electrified, small automatic refrigerating systems can be installed on the individual cars with excellent results. The difficulty at present is to secure power for the machine while the car is on a siding.

Automatic cooling systems have already become so popular for household refrigerators that there are today sixty firms building machines of this type. The South offers the household machine the best opportunities, the need for efficient cooling methods naturally being more nearly constant there than in cold climates. The field for automatic refrigeration is promising. As devices are perfected for controlling the flow of ammonia, cooling water and electric current so as to maintain even temperatures where required, manual operation is bound to give way on installations for hotels, restaurants, hospitals, small dairies and ice-cream plants, bakeries, candy and flower shops, markets, etc.

Simplicity is now the most needed improvement in automatic equipment. The fellow who gets out a sort of "Ford" self-operating refrigerating machine will find a ready market for it.

Office buildings, stores and work shops will doubtless be furnished with air-cooling systems some day, just as many theaters are at present. Mechanical refrigeration is well adapted to this service (wherever it comes into favor), as the excess moisture which must be got rid of when warm air is cooled is readily condensed in the form of frost on the ammonia pipes. Those who have experienced a summer's work in a cooled office say that they felt comfortable even after leaving the office in hot weather —a cold swim produces the same effect—were free from catching cold, and could work with far better efficiency on account of the cool, crisp air. It may be that pipe lines laid down in the streets of cities will carry the ammonia or chilled brine necessary for such refrigeration; pipe-line refrigeration is already in operation on cold-storage work in a dozen large centers, the extensive systems in St. Louis and Boston being notable examples.

New uses for refrigeration will continue to be found. It is possible that some refrigerating medium more easily handled than ammonia will be discovered which, by cheapening the apparatus necessary, will widen the scope of the art enormously. The requirements of a perfect refrigerant are that it will evaporate at a low temperature under atmospheric pressure, and will condense to a liquid again when compressed to a reasonable pressure (say 50 to 100 pounds) and cooled by ordinary water. The liquid must absorb as much heat as possible when boiling into a gas. It must further be cheap to produce, non-injurious to persons or goods in case of leakage from the system, and must not form acids when mixed with water or air in the system itself, as these acids would attack the metal of which the machinery is made. The ideal substance would be an inert gas similar to the nitrogen in the air we breathe, in that it would not burn nor explode. When this element or mixture is found, look out! for refrigerating engineers will startle the world with it.

South Leads in Lead and Zinc Output

THE SOUTHEASTERN Missouri region produced 66 per cent of the lead output of the Central states and 38 per cent of the primary lead recovered from domestic ore smelted or refined in the United States in 1922. The Joplin region alone produced 33 per cent of the lead and 95 per cent of the zinc of the Central states in 1922 and was much the largest producer of zinc in the United States, yielding 80 per cent of the total zinc produced from domestic ores.

In 1923 the United States produced 534,000 tons of lead and 508,335 tons of zinc.

The Development of the Portland Cement Industry in the South

Some Interesting Facts About Its Early History and Growth, and Its Present-Day Importance

By Kenneth Rotharmel, Chicago, Ill.

Twenty-five years ago the manufacture of Portland cement was practically unknown in most parts of the South. There were only a very few scattered plants engaged in this business in the Southern states. In fact, United States Geological Survey reports for 1900 show that in that year the South had three Portland cement plants, located in Texas, Arkansas and Virginia, with an annual production of approximately 125,000 barrels — a quantity that any one of a number of modern mills will produce in a few weeks.

Kenneth Rotharmel

Today the manufacture of Portland cement is one of the important Southern industries. There are some thirty plants conveniently located through the sixteen states recognized as "The South" by the Manufacturers Record, including the border states of West Virginia, Texas, Missouri, Arkansas and Oklahoma. A number of the "show plants" of the country are found in this area—great mills representing the last word in modern cement making efficiency.

In spite of the fact that 1924 marks the one hundredth anniversary of the invention of Portland cement, the industry was not established in this country until 1872. Credit for the invention goes to Joseph Aspdin, an obscure English brick mason, who was awarded a patent for the material in 1824 by King George the Fourth. He called his new material "Portland" cement because of its supposed resemblance, when hardened, to a popular building stone found on the Isle of Portland off the coast of England.

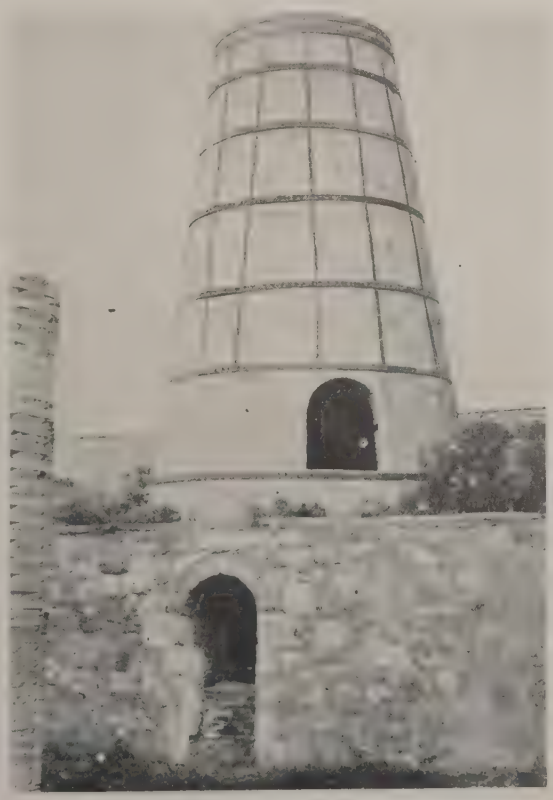
Prior to Aspdin's discovery, cementing materials had been in use for many years. The ancient Romans, Carthagenians and Egyptians were more or less acquainted with a form of natural cement. On many of the ruins of the old temples erected by the Romans the marks of the forms are still visible, showing where concrete was used. The dome of the Pantheon is perhaps one of the best examples of their use of concrete. Even before the time of the Romans the Carthagenians had constructed a 70-mile aqueduct in northern Africa with a form of natural cement.

The cement used by the Romans was slaked lime mixed with volcanic ash. It was largely a gift of nature and there was no way of controlling its quality. It is doubtful if the Romans understood anything about the chemistry of the material.

With the decline of Rome, the secret of their cement was lost. It was not rediscovered until 1756, when an English engineer named John Smeaton discovered that an impure limestone containing a certain amount of clayey matter possessed decided hydraulic properties when burned. With the material used by the Romans this burning had been done by the volcanoes. At the time of his discovery Smeaton was engaged in constructing a lighthouse on the famous Eddystone rocks in the English Channel. His material proved very successful and the lighthouse stood for years before being torn down to make way for a larger one.

Following Smeaton's discovery various experimenters busied themselves in the cement field and information was added from time to time. In 1824 came Aspdin with his Portland cement. His chief contribution was the discovery of the value of mixing, proportioning and grinding his raw materials before burning them. However, he was not a chemist, and the development of this side of the material was carried out by Isaac Johnson, also an Englishman.

In the United States deposits of cement rock were discovered as far back as 1818 when Canvass White found the material in the state of New York. These deposits were uncovered by the excavation work for the Erie Canal, started in 1817. Other deposits in various parts of the country soon followed, and natural cement was soon on the market. Great quantities of it were used in the construction of the transportation canals of the country, which incidentally frequently led to the discovery of additional deposits.



AN EARLY ENGLISH KILN

Built in England About 1850 by William Aspdin, Son of the Inventor of Portland Cement

Old records show that natural cement was made in Maryland in 1836. In that year deposits of rock were discovered near Cumberland, while the following year a contractor on the Chesapeake and Ohio Canal found a bed of material suitable for cement making near Round Top. The plant at the latter place secured its power from the discharge of the water of the canal into the Potomac River.

Georgia was also a pioneer in the natural cement field. A clergyman, the Rev. Charles W. Howard of Charleston, S. C., discovered cement rock in 1850 at Cement, Ga. St. Julien Ravenel, an intimate friend of Professor Agassiz, associated with Dr. Howard in analyzing the rock and in manufacturing cement. In 1867 Col. George H. Waring of Savannah took over the plant, operating it as the Howard Hydraulic Cement Company.

The essential difference between Portland cement and the old natural cements is that Portland cement is a scientifically manufactured product, the chemical constituents of which are carefully predetermined, while natural cements were made from rock just as it came from the quarry. The rock was merely broken into pieces, heated at a comparatively low temperature, and then pulverized. These natural cements depended upon nature for their proportioning and mixing. For Portland cement specific quantities of different ingredients are proportioned, pulverized and intimately mixed; burned at extreme temperatures to hard clinker and reground to extreme fineness. Standard specifications demand that cement be ground fine enough for at least 78 per cent of a given quantity to pass through a sieve with 40,000 holes to the square inch—a sieve that is finer than a silk handkerchief.

The Portland cement industry had been developing in England and on the Continent for almost half a century before the first American mill was started. In 1872 David O. Saylor, who had been making natural cement at Coplay, Pa., entered the Portland cement field. Within a few years other plants were opened in various parts of the country. However, very little was known about the manufacture of this material and the old pioneers were forced to solve many difficult problems. In trying to discover facts about the burning of the raw materials, Saylor would experiment by carrying pieces of rock home in his pocket and burning them in the kitchen stove. John K. Shinn, another Pennsylvania pioneer, created a primitive grinding machine by suspending a bent car-axle from a spring pole and bouncing it up and down on the materials. Thomas Millen of South Bend burned small quantities of raw material in a piece of sewer pipe and afterwards ground them in a coffee mill.

It is interesting to note that the first use of American-made Portland cement in this country on a large engineering project is credited to a Southern state. In 1875-79 when James B. Eads undertook the construction of the famous jetties that bear his name, at the South Pass of the Mississippi River near New Orleans, he decided to use Portland cement. So far as is known this was the first large American construction project in which American Portland cement was used.

The first Portland cement plant in the South was established at San Antonio in 1880. An Englishman named William Lloyd, while hunting near what was then the town of San Antonio, discovered some rock which he recognized as similar to rock used in making cement in England. Analysis proved his supposition to be correct, and a company was organized. The quarry was located several miles from town and as the community developed it encroached on the cement-plant site. Later the plant was moved to a new location. City officials, with the assistance of the cement company, converted the old quarry site into a beautiful part of what is now Brackenridge Park. The quarry pit is now a Japanese sunken garden and lily pond. The quarry face has been utilized for dens for the animals of the park zoo, giving them a natural setting. The old Schoeffer kiln in which the raw materials were burned is now a castellated tower. The grinding stones are used as table-tops in the shelter houses. Where once there was an unsightly quarry there is now a beautiful garden spot, marking the site where the first Portland cement in the South and West was produced.

The San Antonio plant, operated by the Alamo Portland Cement Company, had the field to itself for a number of years. Later a plant was started in Arkansas, which went into operation in 1897. The next year saw a plant

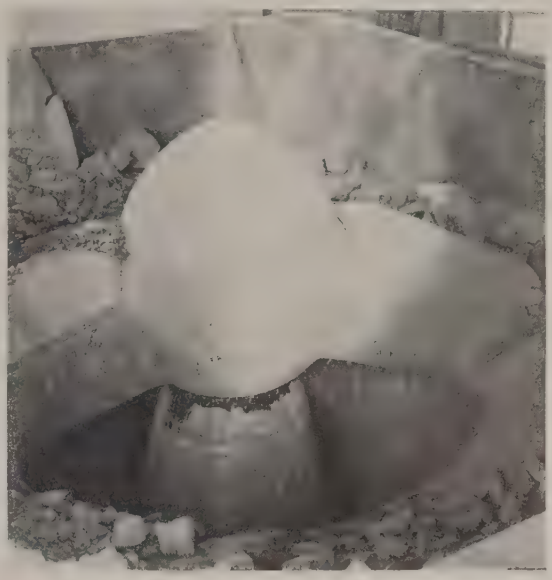
FIRST PORTLAND CEMENT IN THE SOUTH WAS MADE AT SAN ANTONIO IN 1880

The Old Quarry Pit Has Been Converted into a Japanese Sunken Garden and Lily Pond as a Part of Brackenridge Park

established in Maryland, and by 1902 there were additional plants in Alabama, Missouri and Georgia. In 1905 Kentucky reported its first production of Portland cement.

The Alabama plant, started in 1901 at Spocari, was controlled by English capital. It was operated for a number of years before it was finally closed down. Later it was taken over by another organization. One of the cement pioneers recalls that the name "Spocari" was given to the plant site by taking the first letters of the names of three of the officials—Spoor, Cairns and Richardson. Negro laborers at the plant, however, insisted that "Spocari" was the Greek word for cement.

The difficulties encountered by the early plants were not confined to manufacturing methods. As improved grinding machinery took the place of the old-fashioned buhr stones, and as the rotary kiln supplanted the old dome-like kilns, the production of cement was greatly improved. But the home product had a hard fight to establish itself, and it was not until 1900 that the production of Portland cement equaled the production of natural cement. United States Geological Survey figures show that in 1900 the American mills produced 8,482,020 barrels of Portland cement, while the natural cement production amounted to 8,383,519 barrels. The year 1900 marked the start of the real development of the industry. By 1905, according to the United States Geological Survey reports, production had increased to 35,246,812 barrels, in 1910 to 76,549,951 barrels, in 1915 to 85,914,907 barrels, in 1920 to 100,023,245 barrels and in 1923 to 137,377,000 barrels. Where in 1900 there were but three Southern plants contributing to this production, in 1923 there were about thirty.



Type of Crusher of the Early Days

THE OLD-FASHIONED KILN USED IN THE SAN ANTONIO PLANT IS NOW A CASTELLATED TOWER

This Marks the Spot Where the First Southern Cement Was Made

Back of this development there were many contributing factors. The advent of the automobile brought a demand for improved highways, and the concrete road business became an important industry. Towns and cities began to boast of their cement sidewalks, swimming pools, fire-safe homes and office buildings. Farmers recognized the value of concrete silos, feeding floors, ratproof granaries, troughs, dairy-barns and the numerous other improvements that add to modern farming efficiency. The South has been particularly active in this type of development, especially during the last few years. In this connection it is interesting to note the approximate distribution by uses. The following table is based on estimates given in the United States Geological Survey report for 1922, showing where the production of Portland cement is used:

	Per cent
Public and commercial buildings	24.9
Dwellings	9.4
Sidewalks and private driveways	6.9
Miscellaneous farm uses	20.6
Concrete pipe for water, sewers, irrigation and culverts	4.3
Paving and highways	24.0
Railways	5.2
Bridges, river and harbor work, dams and water-power projects, storage tanks and reservoirs	3.0
Miscellaneous uses	1.7
Total	100.0

Some one has described cement manufacture as "the art of tearing down a mountain and putting it through a sieve." A trip through a cement plant proves this description to be more accurate than it might sound to the uninitiated, because thousands of carloads of rock are constantly being blasted loose from quarry and hillside for

Blasting Down a Hill to Secure Rock for Cement Manufacture

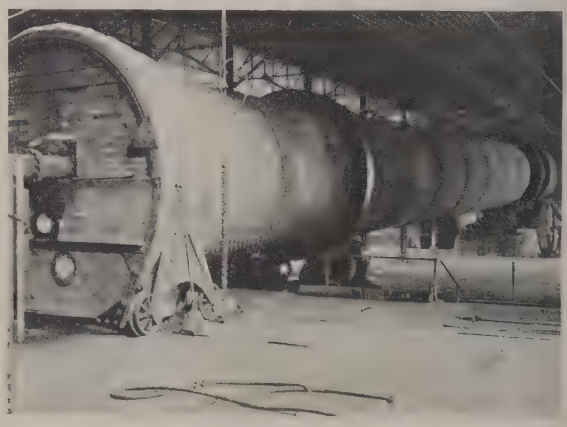
use in the cement plants, and through the means of over eighty manufacturing operations this rock is reduced to a powder finer than flour.

The essential elements of Portland cement are lime, silica and alumina. These are obtained in various combinations of raw materials, including cement-rock and limestone, limestone and clay, or shale, marl and clay, or shale, and blast furnace slag and limestone. Before a plant is established the natural deposits must be analyzed and assurance given that there is sufficient material to warrant the construction of an expensive mill.

When the plant starts operation the raw materials must be available in a steady stream. In the rock quarries huge ledges of material are blasted down. It is an ordinary job for the blasting crew to discharge 10,000 pounds of dynamite at a single shot, while charges of 80,000 pounds have been exploded in some instances. The cement industry uses over 16,000,000 pounds of dynamite and powder in a single year.

Steam shovels pick up the rock in the quarries, and load it on cars for transportation to the mill. Marl and clay are frequently dredged from their beds by giant bucket dredges. At the mill the rock goes into a great crusher where it is reduced to smaller pieces. Secondary crushers reduce it still finer and the various ingredients are exactly proportioned by automatic scales. The materials are then ground to a fine powder, which is fed into the inferno of the rotary kilns. As the kilns revolve the powder makes its way through the burning zone. The extreme temperature converts it into a white-hot clinker, which when cooled is hard enough to scratch glass. It is in this burning operation that a chemical reaction takes place that gives the material its cementing qualities. In mills where the "wet process" is used, the raw materials are mixed with water when proportioned and enter the kilns as a "slurry," or thick, soup-like mixture.

Where the ancients depended on nature for burning the rock in volcanoes, the modern cement man has gone



A Modern Rotary Kiln in Which the Raw Materials for Cement are Burned

nature one better and does the burning much more effectively. Not only that, but he grinds his raw materials to extreme fineness so that they are intimately combined in the burning.

The clinker is cooled and frequently stored in huge storage piles before it is sent to the grinders. The finer grinding is often done in tube mills—steel jacketed, armor-plated cylinders loaded with charges of steel balls. As the cylinder revolves the balls climb the sides, rolling and falling on the clinker until it is reduced to powder. In this final grinding a small amount of gypsum is added to regulate the setting time of the cement. Without it the material would harden so quickly that a workman would not have time to place it properly on the construction job.

The finished cement is carried by various types of conveying machines to storage bins and thence to hoppers connected with the sacking machines. In the old days cement was packed by hand, and it was necessary for the workman to weigh the exact amount and regulate the sack's contents by adding a little or taking out a little with a hand scoop. The operation is quite different in a modern cement plant, for the sacking is done by an ingenious machine. Strange as it may sound, the sacks are filled after they have been tied. The empty sack is

tied with a short, stout wire bond. In the bottom corner of the sack is a valve opening, formed by a peculiar way of sewing the sack when it is made. This opening is placed over a spout on the filling machine and the cement forced into the sack under pressure. When exactly 94 pounds of cement enters, the sack drops off to a conveyor belt and is carried to the waiting freight car or truck for transportation to the user. The weight of the contents keeps the valve flap tightly closed. The 94-pound content is used for a sack because that is the amount required for a cubic foot of cement. The measuring is done at the mill, and the contractor or workman on the construction job knows the exact content of every sack.

There is a close relationship between the manufacture of cement and various other Southern industries. For example, there are approximately 225,000,000 cloth cement sacks in use in this country at the present time. About 225,000 bales of cotton would be used in making cotton cloth for these sacks. Last year alone approximately 60,000,000 cloth sacks were lost or destroyed. A strip of cotton cloth 34,000 miles long and 30 inches wide is represented in the sacks for replacements. It would take 3200 looms, working every day for one year, to make this cloth. Thousands of acres of cotton were needed for this one item alone.

The cement industry in this country consumed some 10,500,000 tons of coal last year, and many a Southern coal miner devoted his time to mining coal for the Southern plants. The industry required 4,500,000 gallons of lubricating oil and 4,500,000 pounds of grease during the year, furnishing an excellent market for these materials. In addition to the coal the industry burned about 4,700,000 barrels of fuel oil and 4,000,000,000 cubic feet of gas during 1923.

As cement is rarely used alone, it naturally creates a market for other materials. To make concrete it is necessary to mix sand and stone or pebbles with cement and water. It is estimated that the concrete industry created about 10 per cent of all the freight hauled by the railroads of the United States last year.

Comparison of the development of the Southern cement industry and the building activity of the Southern states during recent years shows why cement is generally recognized as a good barometer of the construction industry. Cement is used in some way or other in practically every form of modern construction. Where there is building development there is a demand for it. The remarkable strides taken by the Southern states in the construction field naturally created an increased demand for the material, and brought about the construction of the numerous new plants within the last few years. Alabama, Texas and Tennessee are outstanding examples of this development, while improvements in other states have helped establish the cement industry as one of the important industries of the South. At the present time there are Portland cement mills in Georgia, Alabama, Texas, Oklahoma, Missouri, Tennessee, Virginia, West Virginia, Maryland and Kentucky.

In co-operation with Lewis Institute, Chicago, the Portland Cement Association maintains the Structural Materials Research Laboratory in the institute buildings. The association was established in 1902 as the educational-promotional-research organization of the cement industry. At present it represents about 90 per cent of the production of this country, and includes in its membership operating plants in Canada, Mexico, Cuba and South America.

The laboratory is the only one of its kind in the country devoted exclusively to cement and concrete research. About 35 people are employed for this work, and every year thousands of tests are carried out to develop information that will assist concrete users to get maximum results. Facts from the laboratory are distributed through bulletins, lectures before technical and engineering societies and through personal contact of the field engineers of the association. These engineers work out of the 29 district offices maintained in various parts of the country and carry their service directly to the construction job, no matter how large or small. The laboratory is a striking example of the benefits derived by modern industry and the public through scientific research.

At the present time Southern district offices of the Portland Cement Association are located in Atlanta, Dallas, Parkersburg, New Orleans, Jacksonville, Birmingham, Oklahoma City, St. Louis, Kansas City, Charlotte and Memphis.

The following table, taken from United States Geological Survey reports, shows the use of Portland cement in the Southern states in 1914 as compared with 1923:

USE OF PORTLAND CEMENT BY STATES

States	1914 Barrels	1923 Barrels
Alabama	517,405	1,489,531
Arkansas	400,607	848,509
District of Columbia	341,227	756,723
Florida	460,974	1,299,746
Georgia	511,385	1,424,552
Kentucky	874,538	1,566,682
Louisiana	583,159	1,028,520
Maryland	1,624,180	1,827,684
Mississippi	206,782	457,907
Missouri	2,940,638	3,492,453
North Carolina	529,643	3,108,367
Oklahoma	508,233	2,120,313
South Carolina	176,693	626,912
Tennessee	802,711	1,267,245
Texas	1,821,628	3,328,619
Virginia	1,008,492	1,742,200
West Virginia	1,250,557	1,817,112
Total South	14,558,852	28,203,075
United States	84,419,275	134,703,313

Gypsum

IN 1923, for the first time, the quantity of gypsum mined in the United States exceeds 4,000,000 short tons, reports the Geological Survey. The output showed an increase of 26 per cent over that of 1922.

In 1923 two Southern states, Oklahoma and Texas, produced, respectively, 290,121 tons and 344,104 tons of gypsum. This gives a total production in the South for 1923, including some gypsum produced in Virginia, of over 635,000 tons, as compared with the total gypsum production in the United States in 1923 of 4,753,448 tons.

Sales of crude gypsum to Portland cement manufacturers in 1923 were 15 per cent greater than in 1922. All producing states reported increases except New York.

GYPSUM PRODUCED AND SOLD IN THE UNITED STATES

Year	Crude produced (short tons)	Value of crude and calcined sold
1918	2,057,015	$11,470,854
1919	2,420,163	15,727,907
1920	3,129,142	24,533,065
1921	2,890,784	23,700,290
1922	3,779,949	29,361,151
1923	4,753,448	34,888,155

Cotton and Its Relation to World Affairs

In nearly all publications on the South prominent attention has been given to the cotton crop until many people have come to believe that upon the production of cotton depends the prosperity of the South. This view is entirely erroneous. It would have been better for the South if it had never raised a bale of cotton. The world would have been poorer but the South would have been richer. The concentration in the early part of the Nineteenth Century on cotton production following the invention of the gin resulted in turning the industrial trend of this section away from manufacturing and mining to cotton growing, thus fastening around the neck of industry in the South the curse of slavery. Without cotton slavery would have gradually passed out of existence in the South by the economic as well as by the moral forces that were at work. The raising of cotton with slave labor, and with the world eager to buy all the cotton that could be produced, resulted in cotton and slavery becoming fixed ideas in the minds of people of the central South.

The planters, with their large wealth and culture, dominated the situation, and the poorer classes of white people were thus seriously handicapped, since they did not want to work in competition with slavery. A large proportion of these white people, therefore, moved away from the richer agricultural sections of the central South, where cotton growing dominated, first up to the Piedmont region, then to the mountains, and eventually millions of them passed on to the West. While death, of course, had taken its toll by the hundreds of thousands during the forty or fifty years while this migration was under way, there were still 924,000 Southern-born whites living outside of that section in 1860. In the fifty years between 1810 and 1860 Southern cotton largely controlled the politics and finances of the world, and, broadly speaking, it could be said that this condition has not wholly changed since 1860. The world still depends upon the South for nearly 60 per cent of its entire cotton consumption. Upon Southern cotton depends practically the existence of the Lancashire cotton industry, with more than 53,000,000 spindle, or one-third of the total number in the world. France, Germany and other European countries, as well as Japan, also look to the South for their cotton. Exports of cotton from the South have for many years been the chief item in our foreign exports and have held the balance of trade in our favor when without it the balance would have been heavily against us.

Every banking house in America, every political economist, every student of world affairs has recognized the supreme importance of cotton and its relation to the commerce, the finance and the politics of this country as well as of Europe. However important cotton has been to the world, it has hampered the diversification of agriculture and the larger development of industry in the South. Without cotton the South would many years ago have become the center of diversified crops, the center of livestock production and a dominant power in industrial development.

There is probably no other crop in the world against which there has been such a tremendous fight, especially on the part of foreign buyers, for the purpose of breaking down prices and holding cotton growers to starvation wages. For a hundred years the English cotton manufacturers especially, and the English Government as well, have put forth their utmost power to break the price of cotton in America and to produce cotton in other parts of the world in order to lessen their dependence upon the South. The lower cotton went the more determined seemed to be this combination against the South's cotton crop, and every advance in the price of cotton has been made an excuse for flooding this country with reports that England would be able to produce cotton in various parts of its colonies. The effort that is being made at the present time and about which much is written seems scarcely any greater in activity or in importance than the efforts which have been made regularly for more than seventy-five years. The world is still as dependent upon the South for cotton as it has been during all that period, and there are no indications today that within the next thirty or forty years Europe will be able to produce sufficient cotton in the tropical regions of Africa or elsewhere to change in the slightest the South's domination of the industry. But the low prices for which foreign spinners and many New England spinners as well have worked so aggressively have brought about a determination on the part of Southern cotton growers to diversify their crops and lessen the attention given to cotton growing. In this diversification will be found the road that leads to broader agricultural prosperity than the South has ever known, except during the flush days when long before the Civil War cotton occasionally brought very high prices. About seventy-five years ago an official report made to the British Government urged that the manufacturers of England should put forth their utmost effort to hold down the price of American cotton, and that policy has been consistently followed ever since.

During the last few years the boll weevil has successfully aided to bring better prices for the cotton crop, and has done for the farmers of the South what all the teaching and preaching of agricultural economists had never been able to accomplish, by forcing many thousands of them to cease concentrating their attention upon cotton and to produce it only as a cash crop after having grown sufficient foodstuffs and feedstuffs for their families and their livestock. In this respect the boll weevil has really been a blessing, though it has cost the farmers of the South many millions of dollars in the form of actual loss on cotton planted and cultivated. It should always be remembered that Virginia, West Virginia, Kentucky, Tennessee and Missouri have given but little attention relatively to cotton.

Prior to the Civil War there were a number of cotton mills in the South and others were being earnestly projected. This industry, therefore, is not a new one to this section. Moreover, in the mountain regions of the Carolinas and Georgia and Kentucky, the native Anglo-Saxons descended from English forebears, developed a home cotton industry which demonstrates to the highest degree the efficiency of these people in the art of spinning and weaving and dyeing. Many of these mountain women have for generations been spinning and weaving cotton in the way of bedspreads and other things and in some cases dyeing them with home-made dyes which apparently never fade. Some of the bedspreads show an unusual degree of skill in design and in production, and many of the dyed spreads indicate remarkable ability in combining colors and in producing at home these fine dyes. Nearly all of these spreads bear some name and the same patterns have been made generation after generation. The people who are today making them do not know the origin of the names, but it is known that they can be traced back to England. The skill shown by these people in this work is suggestive of that developing skill on the part of

the textile workers of the South which is making them the best textile workers, all things considered, to be found anywhere in the world, guaranteeing that in this section there can be developed a skill in designing and weaving unsurpassed by textile workers in this or any other country. It is largely due to this inherited trait and to the good qualities of this Anglo-Saxonism that the cotton industry of the South has been developed to the extent that it has. It is no longer a question, as it once was, whether Southern cotton mills could compete with English mills, for that has been solved. It is now a question whether New England cotton mills can continue to compete with Southern mills, and the verdict is already assured that it is impossible for them to do so. During the past year New England cotton-mill people have invested in the neighborhood of $60,000,000 for the purchase of established profitable mills and for the building of new mills now under way. Many of the greatest cotton mills of New England which long held a domination in this industry are moving to the South and others will soon follow. These people are moving South to escape the conditions which prevail of high taxes and labor legislation in New England. They have no desire to carry their New England labor South, but, on the contrary, they are moving South to escape New England labor conditions.

As shown elsewhere in this publication the cotton-mill employes of the South are of an exceptionally bright and intelligent and interesting character. The cotton mills of the South, it is safe to say, have done more for the advancement of their employes, the education of the children of these employes and the moral and religious advancement of all of them than any other industry in the world has done in the same length of time.

The production, acreage and consumption of American cotton, the value of the American cotton crop, exports, the world's cotton production and percentage produced in the United States, and rapidity of development of American cotton manufacturing are tabulated herewith:

AMERICAN COTTON ACREAGE, PRODUCTION AND VALUE, 1910-1923

Year	Planted Acres	Picked Acres	Production Bales	Average farm price per pound Dec. 1 Cents	Farm value Dec. 1
1910	33,418,000	32,403,000	11,608,616	14.1	$820,407,000
1911	36,681,000	36,045,000	15,692,701	8.8	687,888,000
1912	34,766,000	34,283,000	13,703,421	11.9	817,055,000
1913	37,458,000	37,089,000	14,156,486	12.2	862,708,000
1914	37,406,000	36,832,000	16,134,930	6.8	549,936,000
1915	32,107,000	31,412,000	11,191,820	11.3	631,460,000
1916	36,052,000	34,985,000	11,449,930	19.6	1,122,295,000
1917	34,925,000	33,841,000	11,302,375	27.7	1,566,198,000
1918	37,207,000	36,008,000	12,040,532	27.6	1,663,633,000
1919	35,133,000	33,566,000	11,420,763	35.6	2,034,658,000
1920	37,043,000	35,878,000	13,439,603	13.9	933,658,000
1921	31,678,000	30,509,000	7,953,641	16.2	643,933,000
1922	34,852,000	33,036,000	9,761,817	23.8	1,161,846,000
1923	38,500,000	37,420,000	10,081,000	31.0	1,563,347,000

WORLD COTTON PRODUCTION 1800 TO 1923 AND PERCENTAGE OF CROP PRODUCED IN THE UNITED STATES

Year	World Bales	United States Bales	All other Bales	Per cent U. S. A.
1800-10 average	1,060,000	140,000	920,000	13.2
1811-20 average	1,172,000	231,000	941,000	19.7
1821-30 average	1,541,000	566,000	975,000	36.7
1831-40 average	2,317,000	1,123,000	1,194,000	48.4
1841-50 average	2,692,000	1,953,000	739,000	72.5
1851-60 average	4,216,000	3,242,000	974,000	76.8
1861-70 average	5,027,000	2,186,000	2,841,000	43.4
1871-75 average	6,810,000	3,623,000	3,187,000	53.2
1876-80 average	7,812,000	5,036,000	2,776,000	64.4
1881-85 average	9,224,000	5,867,000	3,337,000	63.6
1886-90 average	11,002,000	7,232,000	3,770,000	65.7
1891-95 average	12,149,000	8,041,000	4,108,000	66.1
1896-1900 average	15,162,000	10,081,000	5,081,000	66.4
1901-05 average	18,070,000	10,801,000	7,269,000	59.7
1906-10 average	20,956,000	11,847,000	9,108,000	56.5
1911	24,723,000	15,693,000	9,030,000	63.4
1912	24,158,000	13,703,000	10,455,000	56.7
1913	25,796,000	14,136,000	11,660,000	54.7
1914	26,022,000	16,135,000	9,887,000	62.0
1915	22,175,000	11,192,000	10,983,000	50.4
1916	22,678,000	11,450,000	11,228,000	50.4
1917	20,970,000	11,302,000	9,668,000	53.8
1918	20,461,000	12,041,000	8,420,000	58.8
1919	23,023,000	11,421,000	11,602,000	49.6
1920	21,787,000	13,440,000	8,347,000	61.6
1921	14,741,000	7,954,000	6,787,000	53.9
1922	18,705,000	9,762,000	8,943,000	52.1
1923	19,125,000	10,081,000	9,044,000	52.7

American Cotton Consumption by States

States	1900 Pounds	1910 Pounds	1922 Pounds	1923 Pounds
Alabama	67,987,000	113,142,000	180,136,000	209,240,000
Arkansas	2,034,000	2,915,000	5,379,000	5,913,000
Georgia	145,833,000	236,666,000	376,601,000	477,623,000
Kentucky	11,972,000	10,846,000	14,348,000	15,526,000
Louisiana	7,282,000	5,171,000	21,348,000	23,575,000
Maryland	39,902,000	30,048,000	21,193,000	22,000,000
Mississippi	10,364,000	13,827,000	24,010,000	27,566,000
Missouri	2,171,000	6,299,000	19,937,000	18,838,000
North Carolina	190,139,000	317,467,000	581,852,000	646,921,000
Oklahoma	.....	1,029,000	4,636,000	5,897,000
South Carolina	230,054,000	302,627,000	436,740,000	502,051,000
Tennessee	15,040,000	33,096,000	61,852,000	69,948,000
Texas	9,304,000	14,128,000	45,966,000	50,746,000
Virginia	17,833,000	34,699,000	99,032,000	85,501,000
Total	749,915,000	1,121,960,000	1,893,030,000	2,161,345,000
United States	1,817,643,000	2,189,000,000	2,962,000,000	3,335,000,000

Disposition of American Commercial Cotton Crop

Year ended August 31	Crops Bales	Takings: Northern mills Bales	Takings: Southern mills Bales	Exports Bales
1860	4,861,292	786,521	178,107	3,774,173
1880	5,761,252	1,573,997	221,337	3,885,003
1890	7,311,392	1,799,258	546,894	4,996,543
1900	9,436,416	2,068,300	1,597,112	6,055,874
1910	10,609,668	1,993,904	2,341,303	6,208,259
1911	12,120,095	1,993,576	2,363,616	7,602,721
1912	16,138,426	2,631,432	2,744,067	10,506,465
1913	14,167,115	2,488,377	2,969,559	8,610,719
1914	14,588,591	2,513,622	3,037,308	8,883,993
1915*	15,108,011	2,883,000	3,471,000	8,357,223
1916	12,938,256	2,864,000	4,117,000	6,035,102
1917	12,940,934	2,943,000	4,362,000	5,533,292
1918	11,906,973	2,883,000	4,207,000	4,215,217
1919	11,639,653	2,317,000	3,571,000	5,485,434
1920	12,443,180	2,675,000	3,726,000	6,366,008
1921	11,377,316	1,991,000	2,922,000	5,639,240
1922	11,653,133	2,402,000	4,047,000	6,121,686
1923	11,282,806	2,403,000	4,389,000	4,643,235

* 1915 and subsequent years end July 31.

In the foregoing table is shown the great progress made in Southern cotton manufacturing since 1860. In that year Southern mill takings were but 178,107 bales, compared with 786,521 bales for the rest of the country. Between 1880 and 1900 the South began its advance in textile making. In the next ten years the South had reached and surpassed New England in cotton consumption, the South in 1910 taking 2,341,000 bales, compared with 1,993,000 bales taken by the rest of the country. Since then the South has been gaining steadily in consumption of Southern cotton over New England, and its mills are now consuming 64 per cent of the cotton spun in all American mills. In fact, the South in 1923 consumed 4,488,000 bales, while exports of commercial cotton amounted to 4,643,000 bales.

In 1880 the South had 687,066 active cotton spindles, compared with 10,653,435 for the whole country; in 1923 the South reported 16,344,000 active spindles, or 45 per cent of the 36,260,001 spindles in the United States that year. The total number of cotton spindles in the world is about 158,000,000, the United Kingdom alone having about 57,000,000 spindles.

The annual value of the South's manufactured cotton products is $700,000,000, or more than double the total value of the country's cotton manufactures in 1900 and about $75,000,000 more than the value of the cotton manufactures of the country in 1910.

Capital in Cotton Manufacturing in United States and South, 1919, the Last Census Report

	United States	South
Cotton goods industry	$1,853,099,816	$837,643,644
Cotton small wares	29,559,474	287,011
Dyeing and finishing textiles	229,948,486	4,153,966
Hosiery and knit goods	516,457,991	70,477,816
Carpet and rug industry	119,196,461	.....
Cloth sponging and refinishing	1,465,956	100,186
Cordage and twine	100,248,987	7,334,918
Total	$2,849,977,171	$919,997,541

In addition to this, there are millions of dollars invested in cotton gins, cotton warehouses and compresses, and billions invested in land and farming equipment, all of which should be taken into account in considering the total capital invested in the production and manufacture of cotton.

In 1919 the South had $919,997,000 invested in cotton-manufacturing plants of all descriptions, but this has since been largely increased and now amounts to over $1,000,000,000. The cotton industry of the world represents an investment of over $25,000,000,000 and employs over 6,000,000 people.

President Coolidge Writes Strongly of the South and Its Future

THE WHITE HOUSE
WASHINGTON

November 14, 1924.

My dear Mr. Edmonds:

It is a pleasure to avail myself of your invitation to express my interest in behalf of the South. That section has been signally fortunate in recent years, despite that it has had to bear its share of the burdens that have come to the nation during and following the war. Its wonderful industrial development, the great progress it has made in utilizing its water power, and the impressive advance in the diversification of agriculture, have all wrought together for the firm establishment of the new era in the South. Whoever knows of that section's splendid resources in both natural endowment and the character of its citizenry, must be confident that it will continue the progress already entered upon. I look for a great further advance in all the interests of the South in the next few years.

Very truly yours,

Calvin Coolidge

Mr. Richard H. Edmonds,
The Manufacturers Record,
Baltimore, Maryland.

Forecast of the Future of the South by National Business Leaders

INSTEAD of attempting a forecast of the future of the South as a part of the story of the South's development—"A Glimpse of the Past, The Facts of the Present, A Forecast of the Future"—it has seemed to the MANUFACTURERS RECORD that such a forecast made by some of the leading business men of America would carry more weight throughout the country, and indeed throughout the world, than anything which might be said editorially on the subject.

We therefore invited a number of leading business men North and West to give us a brief expression of their views of the South as a field for investment and continued agricultural and industrial development.

Their replies are illuminating. Such a symposium of enthusiastic endorsements of the South, of what it has accomplished, what its resources are and what its future will be, has never before been published. Throughout these letters there runs the broad spirit of a patriotic interest in the welfare of the South as one of the nation's greatest assets and at the same time they outline, as these men of affairs see the situation, the achievements to be made by this section in coming years.

Judging by the letters in the following pages, it would have been a comparatively easy matter to secure from the business men of the country enough letters of the same tenor to fill this entire publication.

Every man in the South and every business organization seeking to see an enlarged investment of outside money in the South to individual and national advancement should be interested in spreading these letters broadcast throughout the entire country. The letters follow:

"The Treasure House of the Nation"

ARTHUR D. LITTLE, INC.

Cambridge, Mass., October 30, 1924.

If you would appreciate the basic wealth of our country and its potentialities for industrial development, study the South. It is the treasure house of the nation. The amazing progress which the South has shown in the last few decades is merely an earnest of that greater progress which is close at hand. Let any Northern man consider the industries that would be established in his own section of the country if it but possessed the coal and oil and gas, the iron ore and limestone, the salt, sulphur, clays and minerals, the forests and agricultural lands, with which the South is so richly endowed, and he will have such a measure of potential Southern wealth that it will be strange indeed if he is not impelled to take some part in its development.

ARTHUR D. LITTLE.

"Natural Resources of South When Adequately Developed Will Add Wealth and Power to the Nation Equal to That of All Continental Europe"

THE AMERICAN ROLLING MILL CO.

Middletown, Ohio, October 24, 1924.

Everyone knows that the South is a great empire and yet I doubt that any goodly percentage of our people realize that it comprises one-third of the area of the United States, as well as one-third of its population.

As great progress as has been made in the past twenty years, it would seem to me that the South is as yet entirely undeveloped as far its possibilities are concerned.

Its national resources are so enormous that when they are adequately developed they will undoubtedly add a factor of wealth and power to the nation equal to that of all continental Europe.

One must remember the accessibility of the South to all the great centers of population east of the Mississippi to realize the advantage of further agricultural and industrial development within its vast area.

It would seem reasonable to believe that the South's development in the next ten years would be equal to, if not greater than, that which has taken place in the last twenty-five years.

The South is much more progressive than is generally supposed, as is evidenced by the fact that it is now expending annually one hundred millions more than the whole United States spent for public education as late as 1900, and that it actually expended the enormous sum of $315,000,000 for public education in 1922.

You have already performed a herculean task in the interest of the South. Your present campaign of education, covering the latent possibilities of the South, is of as great value to all the rest of the nation as it is to the South itself, and I wish you great and continued success in your efforts.

GEORGE M. VERITY, *President.*

"The Development of the South Unmatched in History, But Only the Forerunner of Greater Accomplishments"

ALUMINUM COMPANY OF AMERICA

Pittsburgh, Pa., November 6, 1924.

The development of the South in the years that have elapsed since the Civil War is strikingly told in the present issue of the MANUFACTURERS RECORD. It is an achievement unmatched in history and but the forerunner of greater accomplishment in the years that are to come.

The Aluminum Company of America, recognizing these advantages, has developed in North Carolina and Tennessee two large enterprises that are in part aiding in this industrial upbuilding. Around important waterpowers in each state have been built not only aluminum reduction plants employing many thousands of workers, but model towns, comprising attractive homes with modern living conveniences of all kinds, paved streets, water supply, sewers, electric lighting, schools, banks and hospitals, pointing the way to decent living, to education, to refinement and thrift, making industry aid in the uplift of the people who serve it.

The Aluminum Company exemplifies its faith in the

future of the South through what it has done at Badin, N. C., and Alcoa, Tenn., and finds justification and gratification for its accomplishments there.

Industrial development is trending to the South, where it is destined to an assured and brilliant future.

The MANUFACTURERS RECORD in publishing its special edition, THE SOUTH'S DEVELOPMENT, is to be congratulated on its editor's indefatigable work for fifty years for all that makes for constructive Southern thought and accomplishment, and on his vision of the tangible and solid foundation for the development of the South that exists in the unexampled resources of its people, its climate and soil, its raw materials and potential water-power.

ARTHUR V. DAVIS, *President.*

"Safe to Predict an Even More Rapid Development of Economic Resources of Southern States"

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

East Pittsburgh, Pa., October 24, 1924.

It gives me pleasure to say a word in appreciation of the splendid development made by the Southern states during the past fifty years.

This development is not only evidenced by the remarkable growth in many fields of activity, from that of steel and iron production to the manufacture of cotton goods, but in many other ways this part of our great Commonwealth has shown virility in its broad economic development.

The growth of public education in these regions has been very remarkable and speaks volumes for the character of the people.

It is safe to predict a continuation of this development and an even more rapid development of the economic resources of the Southern States during the coming decade. All statistical records point quite definitely to this conclusion.

E. M. HERR, *President.*

"An Insufficiently Appreciated Section of Our Country"

LINK-BELT COMPANY

Chicago, October 31, 1924.

I confess that while I was conscious of the South's growing improvement, it was not until I received your letter that I became impressed with the decided change in the character of the business opportunities which the new, the industrial, South presented.

A review of our business there, during the past ten years, shows that we have, in a measure at least, responded to the change; for whereas, we had a few agents scattered over the South ten years ago, today we have offices at Charlotte, Atlanta, Birmingham, Louisville, New Orleans and Dallas, and agents in Charleston, Mobile and Memphis.

Your letter has quickened our interest, and this will, I promise you, lead us to enlarge our field of activities.

We buy heavily of iron in the South, we want to sell heavily of our own products in exchange.

This interchange of trade is a result which your volume on THE SOUTH'S DEVELOPMENT will surely bring about.

Your publication is, therefore, a fitting memorial of a long and active career steadily devoted to the business and industrial development of an insufficiently appreciated section of our country.

CHARLES PIEZ, *Chairman.*

Amazing Progress in the Past Will Be Exceeded By Far Greater Progress of the Future

New York, October 31, 1924.

Please accept my congratulations upon the completion of your fifty years of service as a journalist. The contribution you have made, not alone to journalism but to the development of the South and of the country as a whole, is one of which you may well be proud, and I am glad to know that you are celebrating the event by publishing an issue of the MANUFACTURERS RECORD devoted to the "South's Development." The progress of the South, against great difficulties, during the past half-century has been amazing, but I venture to predict that what the South and its people will accomplish during the next fifty years will be far greater.

JOHN D. ROCKEFELLER, JR.

"An Enthusiastic Believer in Tremendous Possibilities of South"

HARTFORD FIRE INSURANCE COMPANY

Hartford, Conn., October 29, 1924.

The writer for many years has been an enthusiastic believer in the tremendous possibilities of development existing in the Southern states.

While there have been some notable factors which have handicapped this development, those factors are being steadily and, some of them, rapidly overcome, and the writer therefore feels fully as confident as ever before that in the next twenty-five years there is going to be a tremendous expansion throughout the Southern states in the varied lines of activity which the wonderful resources of that section make possible.

The South possesses almost every resource necessary for the establishment and maintenance of a prosperous, thickly populated community engaged in varied occupations. Of course, agriculture, including the livestock industry, will continue, possibly always, to be the chief industry of the South, and the South is particularly fortunate in having such varied possibilities in the agricultural field. Of the great crops, cotton and corn are peculiarly suited to the Southern territory, but there are other extremely important crops, such as fruit, peas, beans of various sorts, sugar cane, peanuts, and early market garden crops, which make the possibilities of agricultural development in the South almost unlimited. In addition to these factors there is the great mineral and timber wealth of the South which insures the development in that section of vast manufacturing industries, much greater than those which even now make several parts of the South notable for their manufactured output.

The writer can see no reason therefore why the South in the future will not be a great producer of raw material, including food products—in which connection the possibilities of live stock development in the South are only beginning to be recognized—and also a scarcely less great producer of manufactured products, and these two lines of endeavor will be mutually helpful, the one to the other.

To handle all this development the South is already splendidly equipped with rail facilities, has a large number of ocean ports suitable for foreign trade, is spending vast sums for the building and improvement of public roads, and finally is making certain the realization of the possibilities above described by its rapidly expanding program of public education, the lack of which has been one

of the chief handicaps in Southern territory since the Civil War. It seems to me that no other section of the country offers greater possibilities for the investor or for the cultivation of almost any kind of business than do the Southern states.

R. M. Bissell, *President.*

"The South Is One of the Nation's Most Prized and Precious Assets

Continental and Commercial National Bank of Chicago

Chicago, October 31, 1924.

We are all agreed that the South is a most important part of our economic unit. The new thing about it is that, without surrendering its old position or diminishing its wealth-producing efforts and success in agriculture, it is developing its natural resources with increasing vigor and is coming to a balance in the variety and efficiency of its achievements. The attainment of such balance is a first step toward the full and free utilization of its man power and talent. This condition is shown by all the statistics, but an actual view of what has been and is being accomplished makes the statistics unnecessary. What we have been wont to call "The South" is one of the nation's most prized and precious assets.

Arthur Reynolds, *President.*

"The Field for Development and Investment in the South Is in Its Infancy." Hundreds of Millions to Go Into South's Paper Industry

The Pusey and Jones Company

Wilmington, Del., October 27, 1924.

While the subject which you have proposed is one that might demand many thousands of words and still merely touch upon the surface, I am nevertheless trying to give you a few thoughts.

From a purely selfish viewpoint, the business which this company has had from the South during the past three years has been greatly in excess of a million dollars and has been profitable. We believe that the field for development and investment in the South is in its infancy, and this faith, visioned through glasses which focus upon the paper-making industry, is based on the following:

Twenty years ago a few millions covered the paper-making investment in the South, representing the stake of far-sighted pioneers. Today that investment in the South is measured in tens of millions; a decade hence this sum will be counted in hundreds of millions. These are dollars, of which we speak, that should in a large measure come through the South itself.

Paper, the industry which few realize is kindred in annual value to that of steel, will then have come into its own, in the land where nature fosters reforestation, and will solve the problem of the world's shortage of accessible coniferous wood—the basic source of paper.

Great corporations operating Northern mills, originally built within sight of their wood supply, are now forced far back into the Canadian forests and face duty tariffs on their raw material. These operators are already moving quietly but not stealthily in the acquisition of Southern stumpage. As this is written, two $10,000,000 installations are being quietly constructed, but little discussed. Other projects await the clearing of the political skies.

As has been the Southern migration of the cotton spinner, so will follow the travel of the paper maker to the South, with minimized labor troubles and where wood, the essential, is within reasonable distance and value.

The water powers of the South as they become harnessed for industrial purposes cannot but assist in this inevitable expansion. The economical practice of extracting naval stores from Southern pine, leaving commercial pulp as a residue, has been solved.

Chemistry is removing the color hindrance from kraft pulp, making it white and available for the best grades of book paper. This field alone will mean the relocation or re-establishment of paper mills of great tonnage.

What the South most needs today that it may quickly share in the development of its potential paper-making resources, is a joint campaign fathered by the larger Southern chambers of commerce which will bring before the paper makers of this country the indisputable and interesting facts which are not too difficult to obtain.

C. Stewart Lee.

"Destined to Become One of the Richest, Most Enterprising and Progressive Sections of the World"

A. B. Farquhar Co., Limited

York, Pa., October 30, 1924.

For more than half a century I have been dealing in the South. I have always been a firm believer in the South as destined to become one of the richest, most enterprising and progressive sections of our great country and of the world. The South has already more than justified that belief. My confidence in her future is unbounded. In my youth it was, "Go West, young man!" Now I should say, "Young man, go South," for I believe the opportunities there are exceptional.

A. B. Farquhar.

"Will Make the South the Cornerstone of the Nation's Greatness"

Francis P. Garvan

New York, October 31, 1924.

The Manufacturers Record deserves high praise for its continued efforts to secure from the rest of our country recognition and appreciation of the manifold advantages and opportunities of the South and also to bring emphatically home to the people of the South itself the realizable opportunities for social growth and economic development lying at their doors.

That the work has borne fruit there are in abundance visible evidences, that, great as they may seem, are but the promises of what may be accomplished.

The tale cannot be too often told of the South's rich possessions in the minerals that modern society demands in its fabrications, coupled with extraordinary facilities for securing power from water, oil or coal which if wisely used must lead to industrial supremacy. Added to this is a soil and climate whose agricultural possibilities as yet have been realized in but comparatively small areas, and whose potentialities make certain for the future abundance of food and clothing, thereby insuring for society a stability that should be firmer in the South than elsewhere.

The work in economic, social and political development, great as it has been in the South to date, has but begun. That there are men in the South worthy of the tasks ahead, the spirit that defended the Sabine Pass is an earnest,

and the ancient genius of the Southern political forum, convinced that our problems of today demand the aid and the advice more of the chemist, the engineer and the economist than of the lawyer, will make the South the cornerstone of the Nation's greatness.

FRANCIS P. GARVAN.

The Development of the South Appreciated by All the Nation

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS

Pittsburgh, November 1, 1924.

That the South, with one-third of the Nation's area and population, has been able to take an important place in manufactures, mining, and agriculture, after many years of discouragement, should be, and is, a matter of much gratification to our whole people; for it shows that ambition, energy, and ability are not confined to any one section of our country, but a common heritage from the fathers.

Through my long business life I have watched the conditions in the South, and have never lost faith that a part of the country so favored by nature in climate, soil, and coast line, could fail to take its rightful place among the states of the Nation. Your belief in, and enthusiasm for, its development, so persistently and ably shown in the editorials in your MANUFACTURERS RECORD, covering the distant and discouraging past, has assuredly had some considerable part in the wonderful expansion and prosperity of the South. You have lived to see your predictions verified and your efforts crowned with success, and while I know that you desire no other reward than the feeling which comes to a man who has done what he could and sees the fruit of his labor, yet the South owes you a debt of gratitude, which I am sure it will be the first to acknowledge.

WILLIS L. KING, *Vice-President.*

"I Believe the Future Holds in Store a Transcending Development and Progress, of Which all That Has Yet Been Done in Time Will Be Regarded But as the Crossing of the Threshold"

THE EQUITABLE LIFE ASSURANCE SOCIETY
OF THE UNITED STATES

New York, November 5, 1924.

The attention of the civilized world has been challenged by the progress of the South in the last two decades. Such extraordinary development of agricultural and mineral wealth, extension of industries and transportation facilities and utilization of natural resources could not fail to command general recognition. As is usual with widespread movements, this expansion has not been unattended by serious difficulties and setbacks of various kinds, which we can believe have in the main been educative and to an extent salutary.

From the standpoint of the investor the South's record, in so far as it has proceeded on sound lines, has enhanced the attractiveness of the farm lands, city home and business properties, railroads, public utilities, and credit of state and municipal governments as security for investment of the funds of the people by fiduciary institutions, such as life insurance companies.

The society with which I have the honor to be identified, for sixty years has enjoyed the confidence of the people of the South, and in pursuance of its policy of distributing its funds in the regions from which they are derived, has invested many millions in the Southern states in the classes of securities mentioned.

For thirteen years we have made a specialty of assisting people of moderate means with mortgage funds for homes at a reasonable interest rate under the equitable home purchase plan, which has made a strong appeal to the home-loving Southerner. These loans have been extended to homes in more than a hundred selected cities in the South, and have meant effective assistance to thousands of families. The loans we have made on farm lands have, we believe, been equally helpful to the farmers interested.

Our faith in the stability and the future of the South has been well shown by our works. Knowing the resourcefulness and spirit of the Southern people, I believe the future holds in store a transcending development and progress of which all that has yet been done in time will be regarded but as the crossing of the threshold. But this means healthful economy and conservatism in public and private domain, and calls for farsighted, sane and courageous leadership, in order that the advance shall be characterized by soundness and shall endure.

W. A. DAY, *President.*

Growth Slow as Compared With What It Will Be

AETNA INSURANCE COMPANY

Hartford, Conn., November 4, 1924.

The South today presents one of the best fields for expansion of all lines of business of any section of our country.

There have been no booms, no artificial exploitations of the South.

Raw materials of all kinds abound in great quantities, the climate is mild, the soil is fertile, conditions of labor are good: all that is lacking is sufficient capital.

The attitude of the people heretofore hostile to big business is rapidly changing, old laws are being repealed, new laws passed, so that good and safe returns may be expected on money invested in conservative enterprises in the South.

The development which has been slow in the past is growing today and promises to become rapid, but safe, in the future.

R. B. IVES, *President.*

"A Keen and Growing Appreciation of Marvelous Wealth in Natural Advantages"

THE JEFFREY MANUFACTURING CO.

Columbus, Ohio, October 24, 1924.

To the pride in which all Americans have held the personal and social qualities of our Southern neighbors has been added a keen and growing appreciation of the marvelous wealth in material advantages possessed by these states.

It seems a certainty that their development and growth in the next generation, will exceed proportionately that of any other part of our country.

Our Southern states have been to you and the MANUFACTURERS RECORD as gospel for a long and useful lifetime. You have unfailingly upheld these states as a "promised land." They have truly become promises fulfilled.

R. H. JEFFREY, *President and General Manager.*

"The Potentialities and the Future of the South As Being Worthy of the Highest Consideration"

THE AMERICAN EXCHANGE NATIONAL BANK

New York, October 31, 1924.

The economic and commercial achievements of the South since the Civil War are among the most interesting pages to be found in the history of any nation or section. Its capacity for accomplishment has challenged the admiration of thinking men everywhere. It was apt in its adaptation in the values to be found in a diversification of agriculture and industry, and its present financial status is the outstanding proof of its wisdom. In its bosom lie perhaps the greatest undeveloped resources of any section of the United States. Its climate is a feature that it is constantly translating into wealth, since it lends itself economically to agricultural pursuits no less than to manufacturing and commercial undertakings.

I regard the potentialities and the future of the South as being worthy of the highest consideration.

LEWIS L. CLARKE, *President.*

"It Is Hard to Conceive of Any Limitation to the Development of the South"

MONTGOMERY WARD & CO.

Chicago, November 6, 1924.

I feel it is especially fitting that your publication on THE SOUTH'S DEVELOPMENT record the progress of the South for the past fifty years.

The rapid progress that is being made in that section of the country today, not only in agricultural lines but in manufacturing and educational facilities as well, is of great economic importance to the entire nation. No one who has traveled through the South, or who has kept in touch with what has been done there during the past quarter of a century, can have any doubt about the part the Southern states will play in the development of our country.

The progress of the past twenty-five years or so represents but little more than the foundation of the great industrial structure which will be reared in the South within the next decade. Even if there were nothing to depend upon other than the improvement in the agricultural situation, the future would be full of promise, due to the trend from the one-crop policy to diversified farming. But when in addition to this you consider the great opportunities for development of the water-power, port facilities, fuel, mineral and other natural resources of the South, it is hard to conceive of any limitations to the development of that great territory.

Especially significant are the expenditures which have been made and are being made in the South for public education. More than anything else this proves that the people in that section recognize their responsibilities and are alive to their opportunities and their faith in the future of the South is making itself felt the country over.

I find that the close contact the people of one section of our country have with those of other sections, through the medium of good roads and automobiles, has developed a growing appreciation of what the South has to offer in the way of natural resources and climatic advantages. There should be a constantly increasing trend southward among people who wish to establish new homes where the agricultural outlook and industrial opportunities are promising.

The manufacturer who is seeking a location to manufacture a new product or to provide for plant expansion, can hardly afford to ignore the South. Its advantages from the standpoint of economical production, as well as the big and growing market for manufactured products it provides, are worth serious consideration. Certainly no merchandising organization with national scope should overlook the present and future possibilities of the Southern market.

T. F. MERSELES, *President.*

"The South Has At Last Swung Into Its Stride"

BLAIR & CO., INCORPORATED

New York, November 7, 1924.

I wish to extend to you my heartiest congratulations upon the completion of your fifty years in newspaper work and the effect it has had on the growth of the South owing to your efforts.

There is no doubt in my mind that the prosperity now being enjoyed in the Southern states is substantial and will continue. Northern capital has been welcomed and the old feeling which predominated after the reconstruction days has disappeared. New methods, based on business efficiency, have taken the place, to a large degree, of tradition, and profitable business has been the result. This is borne out by the fact that they have been able, to a larger degree, to finance themselves and still have remaining considerable funds seeking outside investment. This diversification of investment is just as important as the diversification of agricultural and other industries, as it tends to set up a reserve for the proverbial rainy day.

As a matter of fact, the South has become a very important security market, which is rapidly growing, and the demand for outside investment has compelled the Southern security dealers to participate in most of the national offerings. On the other hand, securities of the Southern industries, states and municipalities are enjoying an increased demand elsewhere throughout the country, which should tremendously expand as investors become more fully acquainted with the possibilities for investment in this part of the country and what has been accomplished there in the last few years. In closing, I cannot help but feel that the South has at last swung into its stride.

HEARN W. STREAT.

A Great Chemist's Views of the South. A Fortune Made From Southern Sulphur and to Be Dedicated to Agriculture

OFFICE OF

CHARLES L. PARSONS

Washington, November 3, 1924.

I am indeed interested to learn that you are to put out a special publication covering "Fifty Years of Southern Progress." No one is better able than yourself to do this, for the MANUFACTURERS RECORD under your able guidance has been the South's champion for many years. If every intelligent man in the South could have read the facts marshaled in your issue of September 14, 1916, and developed in numberless important articles since, the growth of the South would have been far greater than it has been.

To one who was raised in the South, as I was, and who has watched its marvelous expansion since Reconstruction days, the present South compared with the old is one of our country's marvels. I remember my early trips as a boy over the old Richmond and Danville and Piedmont

routes, over the Shenandoah Valley route, and the days it took to get from south Georgia to New York. I remember the inconveniences of travel and the almost endless vista of cotton, corn, pine trees, bad roads, dilapidated railroad stations and tumbled-down commercial establishments that I viewed continuously from the train window. Annually and sometimes semi-annually I have made the trip since then. Each year there has been a continuous movement, and the development has only begun. It is true that pine forests have largely disappeared, but it is also true that hundreds of manufacturing plants, thousands of neat and attractive employe houses, wonderfully improved sanitary conditions, concrete and asphalt roads, terraced and improved fields, rock-ballasted railroads, modern office buildings, municipal buildings and hotels are on every hand. I remember the thrill and the inspiration I received as a young man from Henry Grady's immortal speech. The day when Southerners can be "buried in graves of solid marble, yet have to get their headstones from Vermont" is past. The quotation is typical. No section of the world has ever seen such rapid development, and no section of the world has greater basic resources of coal and iron, of limestone, of phosphate rock, of sulphur, of fuller's earth and other diversified clays. Its mineral resources in general are almost unlimited, and for complete success it needs only further growth, as the MANUFACTURERS RECORD continuously points out, in manufactured products and in diversified agriculture. "Useless each without the other."

It is pleasing to note in the current press that the immense sulphur deposits of the South which have developed so surprisingly in the last ten years, which are unique in the world, are indirectly again to benefit the South, as well as the rest of the country, in that millions of the Frasch estate are to be devoted to research in agricultural chemistry and all that means. The resources of this estate, which were derived from wealth many hundred feet below the surface, are now to be used to render the fields more productive.

The development of water-power has added, and is adding, great wealth to the people of the South, and it is also pleasing to note that the great power derived from the rainfall over many thousands of miles of territory, but concentrated at Muscle Shoals, will in all probability be again redistributed over that territory where it will benefit thousands of individuals. Local development will, of course, take place, as it should. Nitrogen will be fixed from the air without undue waste of this power. Phosphorus in various forms, both for fertilizer, food, and medicinal use, will be separated from phosphate rock, as is already being done on a large scale at Anniston, Ala. Potash for fertilizer and chemical purposes even may be taken from the serecite of Georgia. Abrasives and aluminum will be made from the bauxite of the South through the application of electricity, carbide from its lime and coal, and ferrosilicon and ferrotitanium and other electrochemical products will undoubtedly follow. The fuller's earth of the South has already displaced the foreign product and multiplied the application in this country of this essential material manifold. Clays for pottery and for paper are daily growing in importance, and bring to mind, perhaps as forcibly as any other one industry, the need of home manufactures to turn them into finished products.

The MANUFACTURERS RECORD has continually and clearly pointed out the road to success for the South. I trust that the South will follow more and more closely the clear path for its development which you have so brilliantly illuminated.

CHARLES L. PARSONS.

"Transformation Into a Vast Commercial Empire Has Been One of Wonders of Our Times"

SOUTHERN PACIFIC COMPANY
J. KRUTTSCHNITT, Chairman,
EXECUTIVE COMMITTEE

New York, November 3, 1924.

The remarkable transformation of the South from a region exclusively devoted to agricultural pursuits into a vast commercial empire has been one of the wonders of our times. The section has been gridironed with railroads and dotted with mining, lumbering, manufacturing and mercantile enterprises, at the same time that the agricultural activities have been increased and the scope of production and markets widened by the diversification of crops and the introduction of improved farming methods.

Where only fifty years ago were widely scattered plantations and villages with sparse populations, bustling modern cities with teeming populations now vie with the older manufacturing and industrial sections of the country for the trade of the world.

The temperate climate, rich soil and mineral and forest resources of this fertile field for the enterprising give assurance of continued profitable development, and these are abetted by the constantly growing number of newly located industries.

J. KRUTTSCHNITT, *Chairman.*

"The Southern States Will Be a Stimulating Factor in the Great Industrial and Commercial Advance of the Nation"

WILLIAM H. BARR
PRESIDENT NATIONAL FOUNDERS' ASSOCIATION

Buffalo, N. Y., October 27, 1924.

I notice that the MANUFACTURERS RECORD is continuing its established campaign for the development of industry throughout the Southern states by publishing notes on the industrial situation from various gentlemen. This is in line with the splendid pioneering work which your paper has led its field in for a great many years.

As a Northern man who has spent a great deal of time in the South, I am convinced that modern industry has served to unite these two sections, both socially and industrially, which makes us all cosmopolitan from any point of view and recognizes that the South is to be a tremendously important factor in the industrial advance of the United States. The agricultural industry in particular is advancing so rapidly throughout the South that the industrial development must follow closely at its heels.

I realize, of course, that the Southern states are spending large sums of money on education, and are setting a splendid example for the other states of the Union. Deposits in the Southern banks are probably ten times what they were fifty years ago, which can be attributed to the advance of both agriculture and industry.

In short, the Southern states will be a stimulating factor in the great industrial and commercial advance of this Nation which will be greatly developed in the years to come.

In conclusion, I should like to say again how much everyone throughout the South should appreciate the splendid work which has been done by the MANUFACTURERS RECORD. I am sure that it will continue to increase its circulation rapidly throughout the Nation in view of its sound and comprehensive editorial policy.

WM. H. BARR.

"The Greatest Opportunities for Advancement and Development During the Next Generation Lie in the South."

VACUUM OIL COMPANY

New York, October 23, 1924.

I believe that the greatest opportunities for advancement and development which exist anywhere in our country during the next generation lie in the South. It has advantages of climate, soil and natural products which are just beginning to be adequately understood and appreciated.

I believe also that the citizens of this section of our great country are awakening, not only to their opportunities but to their responsibilities, and are determined to overcome some of the handicaps which in the past have militated against as ready development as conditions justified. I believe the South offers exceptional opportunities for profitable employment of capital.

EDWARD PRIZER, *Chairman.*

"The South Is Only on the Threshold of Its Development"

UNITED STATES CAST IRON PIPE AND FOUNDRY COMPANY

Burlington, N. J., October 23, 1924.

Our company is interested in the South, and has been for many years, and we have seen our hopes and expectations as to its growth realized, and I feel, as I have expressed many times, that the South today is only on the threshold of its development.

It has many advantages, from a manufacturing standpoint, which are becoming more and more appreciated, as is evidenced by its great industrial development of the last few years.

N. F. S. RUSSELL, *President.*

The South's Future to Exceed the Expectations of Its Most Sanguine Prophets

GREAT SOUTHERN LUMBER CO.

Buffalo, N. Y., October 31, 1924.

You are to be congratulated upon the publication of THE SOUTH'S DEVELOPMENT, but you have set a great task for yourself to adequately cover so large a subject. The past and the present can be shown without any great difficulty, but the future I believe will exceed the expectations of your most sanguine prophets.

The interests with which I am connected had their inception with Northern capital. Over twenty years ago we began investing in Southern timber; that investment has continued without interruption, and we have during the entire period been largely engaged in the development of plans for the complete utilization of our forest resources.

We believe very strongly in the future of the South for our own industries, the manufacture of lumber, and of pulp and paper. We believe that these industries can both be made perpetual. The South possesses a large advantage over any other region in this country for the growing of trees, the raw material of all these products. Several Southern states have shown by their legislation that they are alive to the possibilities of reforestation, and under their laws it is now possible for a land owner to start upon a definite program of tree growing without being overwhelmingly burdened with taxes before the crop is matured.

We look forward to the day when all of our products will be used in Southern territory and propose to prepare ourselves to meet the demands which we are sure will come from the large development that the South will see within a very few years.

A. C. GOODYEAR, *President.*

"The South's Unbounded Resources, Water Power and Climate Will Contribute to a Development Undreamed of in Past"

CHARLES LEE REESE

Wilmington, Del., October 24, 1924.

No one familiar with the South during the last forty or fifty years can fail to be impressed with the tremendous developments which have taken place throughout that vast area since the Reconstruction period following the Civil War. Although to a large extent still an agricultural country, the industrial developments have kept pace with the educational growth. As far back as the eighties, men of vision in the South saw the necessity and importance of the establishment of industries for the utilization not only of her mineral resources, but also her agricultural products. Small beginnings in the fabrication of cotton and manufacture of tobacco have developed into large industrial centers, and today the movement southward in the textile industry is like a flowing river and will result before long in making the South the textile center of the country, if not the world.

Southern sulphur, the basis of the chemical industry, has replaced foreign and domestic pyrites in the manufacture of sulphuric acid to a large extent throughout the world and can be seen in storage in Italy, which country supplied this important raw material from Sicily before the development of our Louisiana and Texas sulphur deposits.

Cheap water-power already developed in the South has had much to do with her industrial development, but the mild climate is a tremendous asset, as it enables the people to live more comfortably on a lower wage than is possible in higher latitudes.

These factors—their unbounded natural resources, both agricultural and mineral, cheap power through the development of abundant water resources, and the mild climate with consequent easy living conditions, will all contribute to a development undreamed of in times gone by. Especially is this true when we think of the development which is bound to follow the realization of the importance of education, both primary and university, which is forging ahead with such great strides as is now evidenced.

CHAS. L. REESE.

Looking for "An Expansion Possible and Probable, Almost Inestimable"

METROPOLITAN LIFE INSURANCE CO.

New York, October 29, 1924.

In my judgment the South has been laying a solid foundation for present and future prosperity vividly reflected in its cheap power, good roads and growing diversification of agriculture and industry. I now look for a rapid and healthy progress in the development of its vast resources with an expansion possible and probable, almost inestimable.

HALEY FISKE, *President.*

"The South's Spiritual and Material Development a Contribution to Civilization Whose Value Cannot Be Computed"

B. F. Yoakum

New York, November 7, 1924.

When we take into the accounting the important fact that the South's entire labor system was tragically destroyed a little over a half century ago, the assertion can be made without any exaggeration that no other region in any part of the world has undergone so substantial and enduring development as has the South in the same period.

Back of the facts that substantiate this assertion is one of the most interesting stories for the historian of the future who will write in logical order the record of the remarkable era in which this generation of Americans has lived and wrought.

Men and women now of mature age have participated in it all, but it is the exceptional man and woman thus circumstanced who have consciously witnessed the great moving panorama. We all have been too enthralled with the task necessity forced upon us to give much heed to the noise and heat generated by our work.

This rapid development of the South has added vastly to the sum total of the national wealth. I am tempted to claim that the South's contribution in this regard is considerably more than a third of the whole. But a factor of even higher value to the country and the world is that spiritually the South's development has kept pace with its material development. This is a contribution to civilization whose value cannot be computed.

In manufacture, in transportation and in agriculture Southern development has maintained virtually an even balance. This attests two facts of unique value: One is that in the main the development has come from within and not from without, thus assuring further expansion through the usufruct of its initial development; the other is that it has produced a stanchly American generation who understand and are content with American institutions.

The age of prophets and of prophecy long since has passed. Therefore, we would have to be plunged back into that age in order to forecast the South's future development as an integral part of the United States, the marvel of the world. I do know that the surface barely has been scratched. In its variety of climate, its richness of soil, its wealth of water-power, the latter only just beginning to be comprehended, and the character of its citizenship the South has no peer on earth. Its progress cannot be checked, and its tremendous future inflames the imagination and almost staggers belief.

The South now realizes keenly that cotton is not its only dependable resource. The South now recognizes that its resources, both in variety and extent, surpass the resources of any other region anywhere. At last this recognition has quickened the energy and emboldened the spirit of the South to wrench wealth from its own fields and forests, its own mines and factories. And permit me to add that in bringing about this recognition the Manufacturers Record is entitled to a very large meed of praise and thanks, for its untiring devotion to the South in pushing forward its marvelous development.

B. F. Yoakum.

Commendation for Efforts Made

26 Broadway

New York, October 22, 1924.

I congratulate you most heartily on rounding out your first half-century of constructive work as a journalist. Few men have had a record to match yours in this respect, or in point of good accomplished.

My very best wishes for the success of your volume on the South's development.

A. C. Bedford.

Crop Diversification Bringing New Prosperity to the South

International Harvester Company

Chicago, Ill., November 17, 1924.

If there is one thing that to my mind stands out in the development of agriculture in the South in recent years, it is increasing crop diversification. If we compare the agricultural output of certain Southern states fifty years ago with that of the present, some significant figures will come to light. They will show a distinct trend away from the evils of uneconomic, soil-depleting one-crop farming.

Various causes may be recited as bringing about this trend. The negro migration to the large industrial cities might at once be named by many as a primary cause, and the boll weevil might be mentioned by many, in addition, as another. I like to think, however, that there is still another and more basic cause. Isn't it possible that the Southern farmer in reaching out for something better is realizing that it is bad business to put all his eggs in one basket, just as is many a one-crop wheat farmer in the Northwest? After all, the problems of the two are very similar. The Northwest farmer also has been suffering from a migration of labor to the big cities. He has his share of pests, and his land, due to one-crop farming, is likewise decreasing in fertility.

Some people will say that one-crop farming such as practiced by so many cotton growers is not farming at all but soil mining. To be sure, if the same crop such as wheat or cotton or tobacco is grown year after year on the same land, production can only be maintained by the use of increasing quantities of fertilizer to supply necessary elements taken out. Nothing illustrates so well the costliness of this one-crop farming in the South as figures on this one item of fertilizer expenditures. In 1899, for example, seven states spent $29,277,000 for fertilizer; twenty years later this figure for one year (1919, peak year) jumped to $222,591,000. With suitable crop rotation and the increasing growing of soil-building crops such as legumes there is not a doubt that this figure will be greatly decreased. That there is considerable interest being shown in the South in legumes is evidenced by the way Southern farm papers are talking about them. Hardly an issue comes to my attention without something on this important subject.

In the realization that he must diversify, the Southern farmer is placing himself on a new plane. Why should he spend his hard-earned cash for feed and foodstuffs brought in from distant points when these can be grown on his own place? Why shouldn't he and his family benefit from such health-building foods as milk, eggs, and fresh pork and beef grown on his own farm in ample quantities to satisfy every appetite? In placing himself on this new plane, moreover, it is not necessary for him to stop the growing of cotton, his main cash crop. Cotton, on the other hand, in smaller acreages and grown more intensively as a part of a definite rotative plan will help swell the net income.

Recent figures on home-grown feeds and cattle show that diversification is taking hold in the South. Comparative figures on corn production in Southern states, for instance, show definitely that the farmer in these states

is increasing his output of feedstuffs. In eleven states, for example, the 1900 production of corn was 671,507,000 bushels and the 1923 production 888,839,000 bushels, an increase of 217,332,000 bushels. A typical Southern state such as Mississippi also increased its number of cattle from 873,000 in 1900 to 1,172,000 in 1923; Georgia likewise for the same years increased its number of cattle from 899,000 to 1,212,000, and Louisiana from 670,000 to 793,000. Other states show similar increases.

Southern agriculture is entering a new era. By diversification, worn-out lands will be built up and production accordingly increased. In the practice of scientific diversification, moreover, one-horse, or rather one-mule, farming will fast be discarded. Labor shortages will not act as a deterrent to production as so many people fear, because substitution of labor-saving machines will enable the farmers to bring in big crops just as they are now doing for the farmers in the middle West. With diversification, also, crops will be maturing at different periods. This will accordingly mean a better spread for labor and the elimination of peak demands that exist where only one crop is grown. In this new and coming era, therefore, I say watch the Southern farmer.

ALEXANDER LEGGE, *President.*

The Story of the South, State by State

IN THE following eighty-six pages thirteen Governors of Southern states and one Lieutenant Governor, and the state geologists of each state with one exception, and that state is covered by a state professor of geology, will be found what may appropriately be called "The Story of the South, State by State."

The Governors have written briefly but comprehensively of the educational, industrial and agricultural advance of their states. The geologists have covered the mineral resources of each state and the development which has already taken place in the utilization of these minerals.

The statistical tables, brought down to the latest available figures, show the progress of each state from 1880 to 1923, thus giving at a glance the facts in regard to the wonderful growth in manufactures, in agriculture, in banking, in school expenditures, in the value of property and in other things.

Though Governor Fields of Kentucky tentatively promised to write a story on Kentucky, and Governor Cameron of North Carolina definitely promised to do so, but were unable to find time during the heated political campaign to do it. However, the facts given in the statistical tables in regard to these states will enable every reader to see exactly what they have accomplished.

The facts brought out so clearly in our statistical tables and in these special state articles will furnish a basis for careful study by the people of each state as to whether their state is in the lead or is falling behind in material and educational matters as compared with other states.

The Blue Book of Southern Progress

ANNUALLY the MANUFACTURERS RECORD issues a handbook of statistical information about the South and every state in it, known as the "Blue Book of Southern Progress."

It has long been recognized as the final authority on the South's material development and resources. While THE SOUTH'S DEVELOPMENT will continue for years to come as a reference book, invaluable to everyone who wishes to know the South, the importance of the "Blue Book of Southern Progress," as an annual publication, makes it an invaluable publication which manufacturers, bankers and others distribute throughout the country.

DISTRICT OF COLUMBIA

Total Area, 70 Square Miles; Land, 62 Square Miles; Water, 8 Square Miles

	1880	1900	1910	1923
Population	177,624	278,718	331,069	*437,571
Property, true value	$220,000,000	$928,740,000	¶$1,171,704,000	†$1,697,270,000
Manufactures:				
Capital	$5,552,526	$17,960,498	$30,552,623	*$63,008,000
Products, value	$11,882,316	$16,426,408	$25,289,136	‡$67,639,000
All Land in Farms, acres	.....	8,489	6,063	*5,668
Improved Land, acres	12,632	5,934	5,133	*4,258
Number of Farms	.....	269	217	*204
Value all Farm Property	.....	$11,535,376	$8,476,533	*$5,927,987
Value Farm Land	.....	$9,700,230	$7,193,950	*$4,156,148
Farm Products, value	$514,000	$870,000	$713,126	$500,000
Farm Crops, value	.....	$669,000	$243,000	$300,000
National Banks:				
Resources	$5,091,550	$26,205,244	$48,703,301	$134,117,000
Capital	$1,507,000	$3,027,000	$6,052,000	$9,527,000
Deposits	$2,154,594	$18,210,911	$23,402,653	$90,816,000
Other Banks, deposits	$3,305,000	$11,605,576	$35,552,000	$97,157,000
Railroad Mileage	.....	32	36	†36
Public Schools, expenditures	$438,500	$1,076,600	**$2,208,000	†$5,723,000
Assessed Value Property	$99,401,787	$202,950,000	$323,969,530	$810,788,000

*Census 1920. †1922. ‡1921. ¶1912. **1908.

The State of Alabama

By Hon. Wm. W. Brandon, Governor of Alabama

In commercial parlance Alabama must be recognized as a going concern in that what she produces within her borders will feed, clothe and house her people, and from her surplus aid in supplying the needs outside her borders.

Alabama's past is but a part of the history of our South. Emerging from the War Between the States penniless and devastated, her institutions in ashes, her school system destroyed, her treasury depleted, she fought her way through "carpet-bag" days, and thus we are proud of all that has come from the struggles, the achievements and the glorious triumphs of our splendid men and women, and we know full well that our supremacy at this time and the great future upon which we are just entering gives full credit and honor to those whose self-sacrifice and energy so well prepared the way that is now easy. Roger Babson only discovered the things our best thinkers knew; that agricultural and industrial opportunities abound in Alabama to an extent not found elsewhere, and that our diversity of natural resources will give employment to both capital and labor in tremendously increasing proportions until Alabama actually becomes the greatest industrial state of all.

Wm. W. Brandon

There is in all the world probably no area the size of Alabama that has so much of genial climate, excellent health conditions, including an abundance of pure water, conservative and intelligent citizenship, vast stores of coal and iron, marble and stone, asphalt and bauxite, pine and hardwood timbers, mountains and plains, rivers and deep water harbor. Among all the states, or among the group of rich Southern states, Alabama stands first in the number of miles of open, navigable rivers, draining the state and carrying commerce north and south, east and west and out through our own harbor to the markets of the world. First, in the South, in the production of pig iron, iron ore, coke products, as well as first in the production of Satsuma oranges, velvet beans, peanuts, sorghum syrup and sweet potatoes. Alabama is also third in the production of coal, fourth in lumber, sixth in cotton and, among all the states outside of the South, stands tenth in total production of farm crops. There are but thirteen states with more hogs and but eighteen with more dairy cattle, and this in spite of the fact that livestock production in the South has come within the last few years. An evidence of development along this line is to be noted by remembering that in 1911 there was not a commercial creamery and but few dairies in the state. Today we have 36 creameries, and but three or four states still make more butter on the farm. Within this same period stockyards, packing-houses, poultry and egg storage-houses and many other industries have sprung up to take care of livestock development.

Corn, wheat, oats, rye, barley and other small grains, cotton, cane, peas, beans, clovers of every variety, native hay grasses, pastures surpassing the famous bluegrass sections, vegetables and fruits, ranging from the apples of the mountain regions to the oranges and grapefruit of the Gulf sections—these are but a few of the many agricultural products that make up a diversified agriculture. These, with cheap land prices and a low tax rate, join in an invitation to the farmer to leave the overcrowded North and come South.

An inexhaustible supply of coal, iron, timber and those other raw products from which industry springs into activity, together with adequate transportation facilities, leaves only one great requirement—Power. Hydro-electric power in Alabama is just now attracting the attention of the world. Muscle Shoals on the Tennessee River is a great searchlight that is throwing out its rays to the investing world. This great project, however, is but one of many other hydro-electric projects and is but one unit in the development of the super-power system that is being perfected in Alabama.

Alabama, by a vote of her people, is spending $10,000,000 in the development of her port at Mobile, and this development is under the supervision of Gen. Wm. L. Sibert, whose experience in building the Panama Canal pre-eminently fits him for the work.

Roads are rapidly being constructed under the supervision of a highway commission, and transportation facilities are being rapidly improved. We are engaged now in spending $25,000,000 of a bond issue, plus Federal funds, constructing roads and connecting all county-seats, and on main highways building hard roads.

Foreign-born white population is but .8 per cent of the total state population. The state's rural population is 78.3 per cent of the whole, thus insuring a plentiful stock from which to draw for industrial and financial development.

While the average death rate in the entire country is 11.6, the death rate for our white population is but 8.4. Of the ten leading diseases causing death throughout the United States, Alabama ranks lower than the North, East and West in all but three, and these three are the least fatal and have been reduced more than 50 per cent in five years.

At the close of the period of Reconstruction we had no taxation for school purposes, no trained teaching force, no qualified supervision, no compulsory attendance, no uniform course of study, no adopted textbooks, no libraries, no laboratories, no gymnasiums, no workshops, no graded schools, no high-school system, no modern buildings, no consolidated schools, no transportation of pupils, no vocational training, no physical and health education, no removal of adult illiteracy, no school improvement clubs, no teachers' organizations, no reading-circle courses, no teacher-training institutions, no educational publications, no articulated system, no free schools. Excepting children alone, we had none of the factors essential to an efficient public-school system. Now, in varying but substantial degrees we have all of the prime factors of such a system.

Within a comparatively recent period our school system has been completely reorganized; state and county boards have been created; state, county and district taxes have been provided; revenues have been increased manyfold; investments in material equipments have been tremendously augmented; courses of study have been revised and enriched; teaching forces and supervisory staffs have been improved and enlarged; vocational training has been introduced and promoted; physical and health education has been recognized and advanced; enrollments have been materially increased; supervision has been professionalized; consolidation and transportation have been encour-

aged and developed; adult illiteracy has been greatly reduced; libraries, laboratories, gymnasiums and playgrounds have been improved and multiplied; school and community betterment service has been instituted and made to function.

Finally, as unmistakable evidence of our progress in education, the Federal census may be cited. From 1890 to 1920, thirty years, one generation, our white illiteracy was reduced from 18.8 per cent to 6.3 per cent; that of our negro illiteracy from 69.1 per cent to 31.3 per cent; that of our average illiteracy from 41.0 per cent to 16.1 per cent. These reductions compare favorably with those made by any other state where similar conditions have obtained. During the last decade only two states excelled Alabama in reduction of percentage of illiteracy.

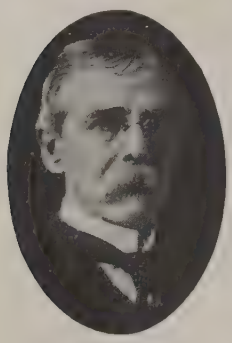
Conservatism of a people and respect for Government and authority is another increasingly important fundamental for industrial development. Alabama has rarely, if ever, run off after strange gods. Our people are fundamentalists in their reverence and respect for constitutional government, and the law-abiding spirit of our people means the absence of the mob-spirit.

Thus it will be seen that in opportunity for home-seekers Alabama offers advantages in education, climate, health conditions and natural resources that probably no other state can boast. Every department of the state of Alabama and every section of the state will welcome the man who is far-seeing enough to join us in working out our industrial destiny—the greatest industrial state in the Union.

Mineral Industries of Alabama

By Dr. Eugene A. Smith, State Geologist, University, Ala.

The first step toward a systematic study of the geology of Alabama was taken in 1847 by the University of Alabama, when Prof. Michael Tuomey was appointed professor of geology, with the stipulation that part of his time should be spent in the geological exploration of the state. He began his field studies at once, publishing in the newspapers of Tuscaloosa important extracts from his notes. In recognition of this effort the State Legislature, in January, 1848, appointed Professor Tuomey State Geologist, without salary, and requested him to make a report of his work for publication by the state. Thus began the first Geological Survey of Alabama.



Eugene A. Smith

In 1850 Professor Tuomey's first report was published by the state. He continued his explorations at the expense of the University of Alabama until 1853. In 1854 the Legislature of Alabama provided for a geological and agricultural survey of the state, appropriating $2500 annually for the salary of the State Geologist, and an additional sum of $10,000 for assistants and to defray general expenses. Professor Tuomey, accordingly, was appointed State Geologist, devoting practically his whole time to the duties of the office until his death in 1857. Immediately after his death Dr. John W. Mallett, professor of chemistry in the university, was commissioned by Governor Winston to supervise the printing of Professor Tuomey's second report, which was published in 1858, along with the second geological map of the state. In these two reports the geologic subdivisions of Alabama were defined, and the future importance of the coal and iron deposits of the state were clearly foreshadowed.

The Civil War and problems of Reconstruction overshadowed all other subjects, so that no geological work was undertaken by the state until 1873, although the Commissioner of Industrial Resources, one of the regular officers of the state government, issued four short reports between 1869 and 1874.

The University of Alabama, upon its reorganization in 1871 after being burned by the Federal troops in 1865, again took the lead in geologic investigation by authorizing its professor of geology, Dr. Eugene A. Smith, the present State Geologist, to spend part of his time in geological field work. In 1873 the legislature revived the Geological and Agricultural Survey of Alabama and appointed Dr. Smith to be State Geologist, appropriating $3000 for equipment and $500 yearly for ten years to defray expenses of the Survey. The State Geologist was to receive no salary from the state, his only compensation being that paid by the University of Alabama for his services as professor in that institution.

These conditions, originally suggested by the State Geologist himself, continued for ten years, during which time the greater part of the state was investigated and reports issued, dealing mainly with the coal and iron resources and agricultural features of the state. During a great part of this time Henry McCalley gave his services gratuitiously as assistant to the Survey.

In 1883 the annual appropriation was increased to $5000, and in 1891 to $7500, since which time the Survey has been supported with frequent moderate increases in appropriations to the present time.

The first blast furnace in Alabama was built in 1818, while between 1820 and 1850 numerous Catalan forges were in operation in Bibb, Shelby, Tuscaloosa and Talladega counties. These early enterprises were due to the initiative of the original inhabitants of the state, but it can be easily seen how most of these undertakings were handicapped by the poverty following the Civil War.

An impression prevails that the importance of the Alabaman natural resources, especially of coal and iron, was first realized by capitalists outside the state, and that our own people were not aware of the extent and importance of these basal raw materials. As a matter of fact the early producers of iron and coal, on which great industries were founded, were natives of Alabama, men whose poverty limited their efforts to make the most of their resources; but they pointed the way, and capitalists have followed their lead helping to build up the industries to which these pioneers contributed their funds and energies.

The production of raw minerals in Alabama in 1922, together with some of the most important derived products, is presented in the table on the following page:

MINERAL PRODUCTION, 1922

	Raw		Derived	
	Quantity	Value	Quantity	Value
Coal, short tons	18,324,740	$42,856,000	.....	.....
Coke, short tons	.....	.....	3,799,865	$14,708,245
Iron ore, long tons	5,294,520	8,791,069	.....	.....
Pig iron, long tons	.....	.....	2,223,159	42,883,424
Limestone, exclusive of marble	.....	787,040	.....	.....
Cement, barrels	.....	.....	2,324,116	4,135,684
Lime, short tons	.....	.....	168,135	979,331
Marble	†	*	.....	.....
Clay products	.....	.....	.....	2,798,255
Graphite, pounds	†	*	.....	.....
Sand and gravel, short tons	848,743	346,920	.....	.....
Clay, short tons	60,523	49,765	.....	.....
Bauxite, long tons	†	*	.....	.....
Sandstone, including ganister	.....	41,395	.....	.....
Barytes, long tons	†	*	.....	.....
Mineral waters, gallons sold	5,389	875	.....	.....
Mica, sheet, pound	†	*	.....	.....
Mica, scrap, short tons	†	*	.....	.....
Manganese ore, long tons	†	*	.....	.....
Miscellaneous	.....	702,533	.....	.....
Total	.....	$53,575,597	.....	$65,504,939

* Included in miscellaneous.
† Less than three producers; Survey not at liberty to publish figures.

PRODUCTION OF COAL IN ALABAMA FROM 1840-1923
(Short Tons)

Year	Quantity	Year	Quantity	Year	Quantity	Year	Quantity
1840	946	1861	10,000	1882	896,000	1903	11,654,324
1841	1,000	1862	12,500	1883	1,568,000	1904	11,262,046
1842	1,000	1863	15,000	1884	2,240,000	1905	11,866,069
1843	1,200	1864	15,000	1885	2,492,000	1906	13,107,963
1844	1,200	1865	12,000	1886	1,800,000	1907	14,250,454
1845	1,500	1866	12,000	1887	1,950,000	1908	11,604,593
1846	1,500	1867	10,000	1888	2,900,000	1909	13,703,450
1847	2,000	1868	10,000	1889	3,572,983	1910	16,111,462
1848	2,000	1869	10,000	1890	4,090,409	1911	15,021,421
1849	2,500	1870	11,000	1891	4,759,781	1912	16,100,600
1850	2,500	1871	15,000	1892	5,529,312	1913	17,678,522
1851	3,000	1872	16,800	1893	5,136,935	1914	15,593,422
1852	3,000	1873	44,800	1894	4,397,178	1915	14,927,937
1853	4,000	1874	50,400	1895	5,693,775	1916	18,086,197
1854	4,500	1875	67,200	1896	5,748,697	1917	20,068,074
1855	6,000	1876	112,000	1897	5,893,770	1918	19,184,962
1856	6,800	1877	196,000	1898	6,535,283	1919	15,536,721
1857	8,000	1878	224,000	1899	7,593,416	1920	16,140,099
1858	8,500	1879	280,000	1900	8,394,275	1921	12,568,899
1859	9,000	1880	323,972	1901	9,099,052	1922	18,324,740
1860	10,200	1881	420,000	1902	10,354,570	1923	18,200,000
						Total	423,585,409

COAL, COKE AND BY-PRODUCTS

The coal fields of Alabama were named by Professor Tuomey from the rivers that drain them—the Warrior, Cahaba and Coosa fields. To these may be added Lookout Mountain, which drains into the Coosa River, but is not connected with the Coosa field proper; and Blount Mountain, draining in part into the Warrior River and in part into the Coosa. It is the accepted belief that these were once continuous and that later anticlinal folds separated them, at the same time determining the structure of the fields. The denuded anticlinal folds now constitute long, narrow valleys extending northeast and southwest.

The coal-bearing strata, as a whole, pitch southwesterly, so that the northeastern areas of these measures lie above the drainage level, while the southwestern areas sink below that level. The distinction is thus drawn between the plateau and the basin region. About 3000 square miles of the Warrior field, approximately half of the entire coal area in Alabama, has contributed 85 per cent of the entire coal output of the state, mainly from the Brookwood, Pratt and Mary Lee seams, which also yield most of the coking coal mined in the state. The Cahaba field contributes about 12 per cent of the state's total, and the Coosa field 4 per cent, or less.

Coal was first mined in Alabama about 1827, near Tuscaloosa, but no record of the annual production is available until 1840, when it was 946 short tons. The table of coal production from 1840 to 1923, inclusive, shows that the entire output for the state did not reach 10,000 tons until 1860. The half-million mark was touched in 1880,

from which time the present great industry really began, along with development of the large iron deposits near Birmingham.

An estimate of the coal reserves of Alabama made by M. R. Campbell in 1920 for the meeting of the Twelfth International Geological Congress, including all seams not less than 14 inches thick and not more than 3000 feet below the surface, after deducting 374,491,870 short tons for total coal mined between 1840 and 1920 and an equal amount for waste in mining, puts the available reserves at 66,711,378,260 short tons.

Coke—The first coke in Alabama seems to have been made in 1854 near Tuscaloosa, and in 1855 near Ragland by William A. Goold for foundry use, but the coke industry proper began February 28, 1876, when the first Alabamian pig iron, using coke for fuel, was made at Oxmoor, in Jefferson county, in beehive ovens. The production in 1880 was 60,781 tons; ten years later, according to F. W. Miller of Birmingham, this had increased to 1,072,942 tons, and in 1897 the production had reached 1,443,017 tons.

The first by-product coke plant in the state was constructed in 1898 by the Semet-Solvay Company for the Tennessee Coal, Iron & Railroad Co. at Ensley, near the blast-furnace plant of that company. There has been a steady increase since in the number of by-product ovens of the various types, Semet-Solvay, Koppers and Wilputte, until, in 1923, according to F. W. Miller, the production was 268,000 tons beehive coke and 3,932,000 tons by-product coke.

By-products—The by-products from these ovens find a market near at home. The ammonium sulphate goes to manufacturers of commercial fertilizer, the coal tar is mainly used for dipping cast-iron pipe, of which the Birmingham district is the largest producer in the world, while the liquid products, which during the World War were used in the manufacture of munitions, now go to the production of motor fuels. The surplus gases find use in boiler plants for power development and for delivery to the municipal supply of the city of Birmingham.

Iron and Steel

Iron Ores—Only the hematite, or red ore, and the limonite, or brown ore, are used in the production of iron in Alabama. In 1922 the output of red ore was 4,619,395 long tons and of limonite 615,173 long tons. The hematite is mined mainly from the Red Mountain outcrop between Birmingham and Bessemer, but in smaller amounts in the Attalla and Gadsden region. The gray hematite of Talladega county promises to be an important factor in the future iron-ore resources of the state.

The Red Mountain ore was not used in Alabama for iron making on a large scale until the time of the Civil War in 1864. The ore used previous to that time was brown ore. The beginning of iron smelting in Alabama seems to have been at the old Cedar Creek furnace in Franklin county, where the first blast furnace in the state was built in 1818. At the same place a Catalan forge was in operation as well as a small rolling mill. The fuel was charcoal made from cedar.

Not until February 28, 1876, was the suitability of coke for making iron clearly demonstrated at the Oxmoor furnace in Jefferson county. This may be considered the beginning of the iron-making career of Alabama. At that time the production of charcoal iron was 20,818 long tons, and the coke-smelted pig-iron production was 1262.

Pig Iron and Steel—According to Frank Crockard* the first steel in Alabama was poured March 8, 1888, at the plant of the Henderson Steel Manufacturing Co., North Birmingham. The original furnace made 200 heats before it was closed down, during which time about 1600 tons of steel were made. The Henderson Company was succeeded by the Jefferson Steel Co., which operated the North Birmingham furnace, of 13 tons capacity, in 1892 and 1893, making about 1600 tons of steel. The total tonnage of basic open-hearth steel made at North Birmingham from local pig iron up to July 1897, did not exceed 3500 tons. At this period the Birmingham Rolling Mill Co. started its first open-hearth furnace July 22, 1897, followed by a second on October 25. These furnaces were of 35-ton capacity each, and used basic iron made at the Alice furnace within 200 yards of the mill. For commercial reasons this plant was abandoned upon completion of the second steel plant at Ensley.

Since 1907 changes, improvements and additions have been made at the steel plants of the Tennessee Coal, Iron & Railroad Co. at Ensley, Fairfield and Bessemer until their present gigantic equipment has been reached. Including the production of the Gulf States Steel Co. at Gadsden, the following table shows the steady development in production of pig iron and steel in Alabama from 1897-1923 and the great promise for the future:

Production of Pig Iron and Steel in Alabama
(Gross Tons)

Year	Pig iron produced	Steel produced
1897	947,831	2,819
1898	1,033,676	9,692
1899	1,083,905	8,543
1900	1,184,337	66,076
1901	1,225,212	113,524
1902	1,472,211	176,252
1903	1,561,398	152,958
1904	1,453,513	196,623
1905	1,604,062	305,117
1906	1,674,848	320,327
1907	1,686,674	319,620
1908	1,397,014	341,336
1909	1,736,617	349,462
1910	1,939,147	529,684
1911	1,712,211	456,576
1912	1,833,658	716,301
1913	2,025,378	778,390
1914	1,826,929	525,770
1915	2,049,453	715,485
1916	2,762,895	1,099,649
1917	2,953,705	1,189,541
1918	2,587,852	1,064,103
1919	2,130,092	1,044,946
1920	2,392,962	1,139,141
1921	1,207,408	709,175
1922	2,230,619	1,091,240
1923	2,797,190	1,850,000

The greater part of the pig iron not used in the manufacture of steel is made into cast-iron pipe, in which industry the Birmingham District is said to lead the world, the annual production of cast-iron pipe being valued at about $21,000,000.

Clay Products

The state of Alabama is rich in clays, yet it ranks low as a clay-producing state, the output being only about 1 per cent of the clay products of the United States. These clay products in 1922 were valued at $2,798,255, and the valuation in 1906 was $1,688,899, an increase of nearly 100 per cent. Of these products common brick is the most important, with sewer pipe and vitrified brick following.

* "Iron Making in Alabama," Geological Survey, third edition, p. 213.

Cement

The first Portland cement plant established in Alabama was near Demopolis, using the Selma chalk and the residual clays of that region. The original name was the Alabama Portland Cement Co., and operating 6 kilns. This plant, owned by the Gulf States Portland Cement Co., has a present capacity of 450,000 barrels annually. The Atlas Portland Cement Co. at Leeds has a capacity of 1,500,000 barrels. These were followed by the Lehigh Portland Cement Company's plant, with a capacity of 1,500,000 barrels; the Phoenix Portland Cement Co., 1,500,000 barrels; the National Portland Cement Co., at Ragland, 750,000 barrels, the five plants aggregating a yearly output of 5,700,000 barrels, showing a remarkable development of the industry. The shales of the Clinton formation and of the Coal Measures supply the aluminous constituent of the cement mix, except in the Demopolis plant, as above stated. In addition to these five Portland cement companies, there is one slag or puzzolan cement company, the Southern in North Birmingham.

The Paleozoic limestones, mainly of Trenton age, have furnished the greater part of the limestone for this industry, but by its composition, abundance and availability, the Bangor (Sub-Carboniferous) limestones of north Alabama may be drawn upon in future.

In the Coastal Plain region the Gulf States Portland Cement Co. utilizes the Selma chalk of the Cretaceous, which formation can be drawn upon, if necessary, by a number of additional plants. A still younger formation, the St. Stephens limestone of the Tertiary, is of wide distribution and important thickness of suitable rock. It has not yet been utilized in cement manufacture, but can be when needed. The limestones of the Trenton and Lower Carboniferous horizons in north Alabama are so widely distributed and of such quality as to insure a practically inexhaustible supply for cement making.

Limestone

The most important use of limestone in Alabama in 1911 was for blast-furnace flux, valued at $458,356, while the production in 1922 was valued at $679,574.

Dimension limestone for building purposes comes mainly from the Tennessee Valley region, from the oolitic rock of Sub-carboniferous age. Within the last few years this cut stone has been furnished on a constantly increasing scale. The amount available is very great. In quality the Alabama stone is much like the celebrated building stone of Bedford, Ind.

Graphite

While graphite has long been known in Alabama, it was not until about 1907 that the flake graphite industry was well established. In 1910 the Allen Graphite Co. and the Ashland Graphite Co. were both in operation, producing a little over a million and a half pounds, valued at over $54,000. The production declined during the next two years to a little over a half million pounds, valued at $21,364. There was a steady increase from about 2,000,000 pounds in 1913 to nearly 8,000,000 in 1918, valued at $999,152, with 42 plants in operation. This increase was due to the fact that the Alabama graphite was found well suited for crucibles, and to the great demand created by the World War. Since 1919 this industry has declined rapidly.

With proper protection the graphite industry might compete with the foreign importations.

Marble

The marble of Alabama is of two kinds. One is a true statuary marble, which occurs mainly in a narrow valley extending from Marble Valley in Coosa county through Talladega county into Calhoun. The quarries longest known are Gantt's and Herd's near Sylacauga, Nix's near Sycamore, Bowie's near Rendalia, and Taylor's and McKenzie's near Taylor's Mill, east of Talladega. From all of these marble was quarried and dressed, before the Civil War, for monumental and decorative purposes. At present the Alabama Marble Co. at Gantt's quarry and the Moretti-Harrah Co., also at Gantt's, are the main producers. The Alabama Marble Co. is equipped with all the machinery for interior decorative work, and their finished product may be seen in more than 200 important buildings throughout the United States, including the National Museum in Washington.

Sand and Gravel

The production of sand and gravel in the state in 1922 was $346,920. By reason of the great increase in the amount of gravel used in concrete for road making, dam building and other construction the production of sand and gravel will grow for many years.

Mica

The pegmatite veins traversing parts of Cherokee, Randolph, Clay, Coosa, Tallapoosa and Chilton counties have yielded in the last 50 years much merchantable mica, equal to the North Carolina product. In 1911 one operator produced 65,000 pounds of merchantable mica. For the year 1915 the output was valued at $5545, decreasing to $3500 in 1918 and going up to $21,635 in 1920.

Bauxite

This mineral was recognized in 1891, the original locality being near Rock Run, Cherokee county. The production from '91-'99 in long tons increased from 292 to 14,499. From the year 1900 the production of Alabama was counted in with Georgia. Within the past two or three years discoveries of bauxite deposits have been made in the Tennessee Valley, notably near Margerum in Colbert county, and in south Alabama, below Eufaula.

Fuller's Earth

A small quantity of fuller's earth was produced in De Kalb county in 1922. While this production was of little importance, Alabama ranked fourth among the producing states for the year. In the Tallahatta-Claiborne horizon of the Tertiary a highly siliceous material has recently been proved to have excellent bleaching properties. This particular formation crops out across the state from west to east in beds of variable thickness and persistence. The material is a silicious replacement of comminuted shell-bank deposits.

Gold

The Alabaman records from 1905 to 1916 show diminishing values of $41,530 to $8650. Since then returns of production are not available. With the expenditure of properly directed capital gold may yet occupy a place among the important products of the state.

Rock Asphalts

Of probable commercial value are found in three counties, Colbert, Lawrence and Morgan. Asphaltic sandstones occur in all three; asphaltic limestones in Colbert county only. The asphaltic limestones are now being developed by C. W. Ashcraft of the Alabama Rock Asphalt Co., three miles south of Margerum, Colbert county, in connection with the Uvalde Company of Texas. A plant was started at Littleville to utilize deposits of sand

asphalt east of that point, but this has not been completed. Three miles from Flint station and six miles southward of Decatur the Southern Rock Asphalt Co. is developing asphaltic sandstones.

Arsenical Ores

In the vicinity of Cragford, Clay county, deposits of arsenopyrite occur which have been under exploitation for the past year. These deposits appear to be extensive, and are well situated in close proximity to river, railroad and hydro-electric power lines. An area five or six miles long and a mile wide contains bodies of arsenical ore. In addition to the recovery values in metallic arsenic, the ores carry gold and a relatively important amount of galena. Although the lenticular ore bodies have not yet been sufficiently blocked, there are distinctly favorable possibilities of developing arsenical ores in sufficient amount and proper grade for utilization in Alabama in the manufacture of calcium arsenate, especially if aided by recovery of the gold and lead.

ALABAMA

Total Area, 51,998 Square Miles; Land, 51,279 Square Miles; Water, 719 Square Miles

	1880	1900	1910	1923
Population	1,262,505	1,828,697	2,138,093	2,423,912
Property, true value	$428,000,000	$774,682,000	¶$2,015,430,000	†$3,002,043,000
Manufactures:				
Capital	$9,668,008	$60,165,904	$173,180,038	*$455,593,000
Products, value	$13,565,504	$72,109,929	$145,961,638	‡$302,809,000
Mines and Quarries:				
Capital	.....	.....	$85,081,804	*$84,167,016
Products, value	.....	.....	$24,350,667	*$59,906,040
Cotton Manufacturing:				
Capital	$1,246,000	$11,639,000	$30,954,000	*$69,673,000
Products, value	$1,228,000	$8,153,000	$22,212,000	*$79,643,000
Spindles, number active	49,432	411,328	952,643	1,294,512
Looms, number active	863	8,549	17,066	23,337
Cotton consumed, pounds	7,272,000	67,987,000	113,142,000	209,240,000
Cottonseed Oil Mills:				
Capital	.....	.....	$7,201,840	*$10,723,890
Products, value	$247,982	$2,985,890	$9,178,016	*$31,714,872
Pig Iron made, tons	68,919	1,184,337	1,939,147	2,797,190
Coke made, tons	60,781	2,110,837	3,249,027	¶¶5,414,000
Lumber cut, feet	251,851,000	1,096,539,000	1,465,623,000	†1,439,200,000
Mineral Products, value	$779,242	$13,701,505	$47,751,109	†$61,723,000
Coal mined, tons	323,972	8,394,275	16,111,462	18,200,000
Iron Ore mined, tons	171,139	2,759,247	4,801,275	6,783,146
All Land in Farms, acres	.....	20,685,427	20,732,312	*19,576,856
Improved Land, acres	6,375,706	8,654,991	9,693,581	*9,893,407
Number of Farms	.....	223,220	262,901	*256,099
Value of all Farm Property	.....	$179,399,882	$370,138,429	*$690,848,720
Value Farm Land	.....	$100,165,571	$216,944,175	*$415,763,862
Farm Products, value	$56,873,000	$91,387,000	$170,939,250	$297,900,000
Farm Crops, value	.....	$73,191,000	$137,541,000	$239,000,000
Cotton Crop:				
Bales, number	699,000	1,044,000	1,194,000	600,000
Tobacco Crop, pounds	.....	311,950	90,572	*2,031,235
Grain Crop:				
Corn, bushels	22,679,000	29,356,000	51,300,000	48,988,000
Wheat, bushels	1,402,000	916,000	336,000	200,000
Oats, bushels	2,926,000	4,381,000	5,236,000	4,792,000
Live Stock:				
Cattle, number	675,000	798,000	933,000	985,000
Sheep, number	347,000	317,000	143,000	86,000
Swine, number	1,252,000	1,423,000	1,267,000	1,089,000
Horses, number	114,000	153,000	136,000	128,000
Mules, number	121,000	192,000	247,000	314,000
National Banks:				
Resources	$5,036,764	$19,055,380	$60,535,285	$172,423,000
Capital	$1,508,000	$3,480,000	$8,750,000	$13,324,000
Deposits	$1,318,889	$10,938,390	$32,911,447	$119,602,000
Other Banks, deposits	$2,269,647	$4,588,607	$20,541,000	$106,871,000
Railroad Mileage	1,843	4,226	5,226	†5,354
Highway Expenditures	.....	**$378,040	††$3,949,019	$14,503,000
Public Schools, expenditures	$500,000	$923,500	‡‡$2,620,300	†$12,828,000
Assessed Value Property	$122,867,228	$270,408,432	$508,568,610	$975,188,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Includes beehive coke produced in Kentucky, Tennessee and Georgia.

Half a Century of Arkansas Progress

By Hon. Thomas C. McRae, Governor of Arkansas

I remember very well the conditions that obtained in Arkansas fifty years ago, the year our present State Constitution was adopted. There has been a lot of progress since then, but not so much as we are going to see in the next fifty years, of course.

In 1874 the population of Arkansas was approximately 500,000. The school population was less than 200,000 at that time, and all of the school property of the state was perhaps worth $100,000.

Thomas C. McRae

The population of Arkansas is now 1,800,000, while the school population is 675,337, and the total value of our school property approximates $22,000,000.

In 1874 our yearly school revenues amounted to about $170,000, but now it runs above $9,000,000 yearly, and it will run to $11,500,000 for next year, according to present estimates. What is called the common school fund of the state amounted to $2.74 per capita last year, but increased to $3.90 for the present year. Owing to new aid authorized by recent legislation, whereby cigars and cigarettes are taxed for school purposes, the per capita distribution next year will be $7.

There were but three banks in Arkansas fifty years ago; now we have 487, with a capital of $39,000,000 and deposits of $206,000,000. This is a good barometer of Arkansas' business development since 1874. Ten years ago savings accounts in Arkansas aggregated approximately $9,500,000, and now they are close to $50,000,000. Bank deposits ten years ago totaled approximately $60,000,000, and for 1924 they will aggregate far above the $200,000,000 mark.

Arkansas is a rural state, evidenced by the fact that her largest city has a population of less than 100,000. Only 291,000 people, of a total population of over 1,800,000, reside in cities and towns of more than 2500 people.

The total value of all farm products for Arkansas for the year 1923 amounted to $287,000,000. Of this amount nearly $100,000,000 came from our cotton crop, the seed from which produced $15,000,000 additional, but the corn for last year was valued at $31,343,000. The apple crop, though a short year, brought $3,328,000, while the peach crop sold for $1,809,000. Arkansas is one of the greatest strawberry states, producing last year more than $1,500,000 worth of this crop.

While Arkansas is a great agricultural state, our mineral, gas and oil production runs high. The value of the petroleum output for Arkansas last year about equaled that of our corn crop, or $32,000,000 in round numbers. Our coal output often runs to $10,000,000 in value for the year. Wealth from Arkansas clays is developing fast, now running to $3,000,000 annually. It is quite well known that Arkansas is the leading state in bauxite production, which output for 1922 aggregated $2,500,000 in value. The natural-gas output from fields in western and southern Arkansas runs into seven figures. Sand, stone, marble and granite, manganese, zinc and lead, and even diamonds, make up millions of dollars of wealth for this state.

Arkansas is first among the states in the production of oak, hickory and gum lumber, bauxite, whetstones and pearls, and is perhaps the only state that produces real diamonds. She is second in the production of strawberries, cantaloupes, cotton and rice. Our state is fourth in the production of peaches and oil. She is fifth in the production of apples, sixth in yellow-pine lumber and sixth in cypress lumber.

The potentialities of Arkansas as a manufacturing state are contingent greatly upon the development of our water-power, but we have already made such progress. It is estimated that our factory output is now valued at $200,000,000 yearly. Factory products in Arkansas for the year 1919 showed lumber and timber at the head of the list, with a valuation of nearly $85,000,000. Cottonseed oil and cake came next for that year running about $25,000,000 in value, with railroad-car construction third on the list, with a value of more than $11,000,000. Rice cleaning and polishing aggregated nearly $9,000,000, while planing-mill products amounted to more than $7,000,000. Zinc smelting and refining totaled nearly $4,500,000 for that year, while printing and newspaper publishing approximated $3,500,000. Cooperage products, furniture, bread and baking products, confectionery and ice cream, food products, canning and preserving, ice, carriage and wagon materials, mineral and carbonated water, foundry and machine shops, coffee roasting, wood turning and carving, slaughtering and packing make up the principal items classified as manufactured products.

The development of railroads in Arkansas since 1874 represents an interesting phase of the progress of things. Fifty years ago our state had a mileage of 305.29, while now we boast a total of more than 5000 miles of railroads. There are forty-four different railroads making up this approximated total.

A discussion of the potentialities of Arkansas would sound very boastful, even if we should adhere to conservative estimates. There are more than 3000 miles of navigable waterways within this state. In addition to the advantages furnished by the adjacent and boundary stretches of the great Mississippi River, the state is bisected by the Arkansas River, both of them navigable in the fullest sense. But our water-power, yet undeveloped, promises great things for our state and for the whole Southwest. Nature's stored fuels—coal, oil and gas—are being rapidly consumed. The present generation may witness an exhaustion of these resources; hence we must look to cheaper and more stable sources of power, heat and light. The average annual precipitation of rain, mist and snow for Arkansas is about 48 inches, or 54 trillion cubic feet. Of this annual water supply, it is estimated that about one-third normally flows off in our creeks and rivers, one-sixth being consumed or absorbed into the earth to replenish ground water, or to maintain the average ground water level, and something like one-half is evaporated. These estimates are borrowed from the dean of the College of Engineering, University of Arkansas. The resources of this state, in water-power, have not been thoroughly investigated. Several private investigations have been made of power sites, and several privately owned power plants are being constructed at the present. Certain it is that hundreds of miles of rivers

and creeks are susceptible of being utilized for water-power. The commercial value of all this is fabulous. There is no conceivable reason why Arkansas should not develop her water-power to the extent of that now being produced in North Carolina, and such a development now seems incipient.

We have the timber, the transportation, the minerals and the labor, and Arkansas must become a manufacturing state. This is inevitable.

The possibilities of dairying in this state are wonderful. Climate, grazing resources, agricultural fitness, accessibility to market—everything—points to a great growth for dairying. In the year 1922 our state produced $33,000,000 worth of dairy products, nearly equaling the value of the corn crop for that year and about one-third of the value of the total cotton crop, but the possibilities of this industry are so great in Arkansas that we may look for much bigger figures in production for the years to come.

Arkansas' highways are beginning to assume coherent form. A new statute for highways was enacted whereunder our state enjoys the distinction of taxing gasoline at a higher rate than any other state. We collect a tax of 4 cents per gallon for gasoline and 10 cents per gallon upon motor oil. An increased but graduated tax upon automobiles also was authorized. These revenues go into road construction, whereby those who use the roads most pay most upon construction and maintenance. The highway-improvement fund for the past year was enough to allow $2,000,000 to be allotted among the counties of the state to retire bonds of local road-improvement districts and interest on them and to construct and maintain roads. It is estimated that this fund will amount to $3,000,000 this year. In less than ten years the state will be enabled to collect and apply annually the gigantic sum of $10,000,000 for roads and highways.

The tax rate for state purposes is lower in Arkansas than in any other state. The total budget was $3.90 per capita last year. An idea of proportion is obtainable from the fact that the states average $12 per capita, some of them running as high as $40.

The state government operates on a strictly cash basis. Every account under our state government shows a cash balance. The aggregate of bonded indebtedness is $2,438,116.67. Instead of going deeper in debt, as seems to be the modern trend, Arkansas is in better financial condition than it has been, as a state, since the beginning of the period treated of in this article, or in fifty years.

Arkansas' Mineral Resources

By George C. Branner, State Geologist, Little Rock, Ark.

Arkansas is known principally as an agricultural state. The value of its natural resources in 1923 was about $415,000,000, of which $270,000,000 was derived from agriculture, $84,000,000 from timber and lumber and $61,000,000 from minerals.

The annual value of the mineral resources increased rapidly during the last few years, and it is anticipated that this increase will maintain a steady and healthy progress for many years to come.

George C. Branner

The variety of the minerals found in Arkansas is due to three general geologic facts: (1) Nearly one-half of the state is composed of Paleozoic sediments, which are usually of great thickness and are consolidated and massive; (2) a little more than one-half of the state is made up of the Coastal Plain sediments, which were laid down during the Mesozoic and Cenozoic eras. These sediments are soft and unconsolidated, and for a considerable depth are frequently moist or saturated with water; (3) intrusive igneous rocks occur in comparatively small scattered areas.

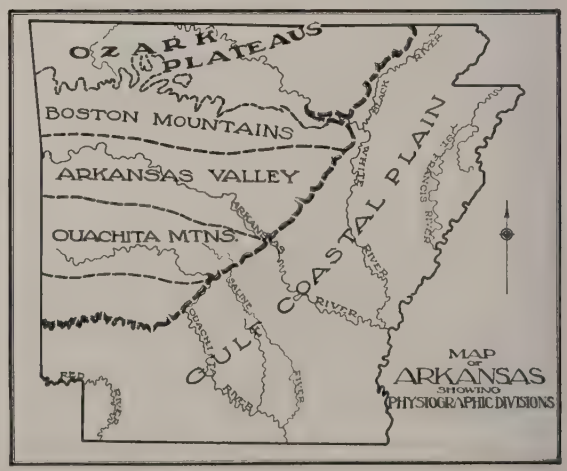
Each of these three general classes of rocks contributes valuable amounts of its characteristic mineral.

The Paleozoic rocks are the source of coal, natural gas, zinc, lead, manganese, silver, copper, antimony, phosphate, and contain extensive beds of novaculite, slate, sandstone, marble, limestone, dolomite, etc.

The Coastal Plain sediments, which were originally derived from Paleozoic land masses, are the source of oil and gas, asphalt, lignite, clay, chalk, gypsum, sand, greensand, gravel, etc.

Igneous rocks, although rather scattered, and covering only a total area of about 14 square miles, are the source of extensive bauxite masses. They also produce the only diamonds found in North America, and are quarried for their granites.

The main physiographic features of the state, which are controlled by the distribution of the sedimentary and igneous rocks described, are best illustrated by a map. These features consist of (1) The Ozark Plateau and Boston Mountains; (2) the Arkansas River valley; (3) the Ouachita Mountains, and (4) the Coastal Plain.



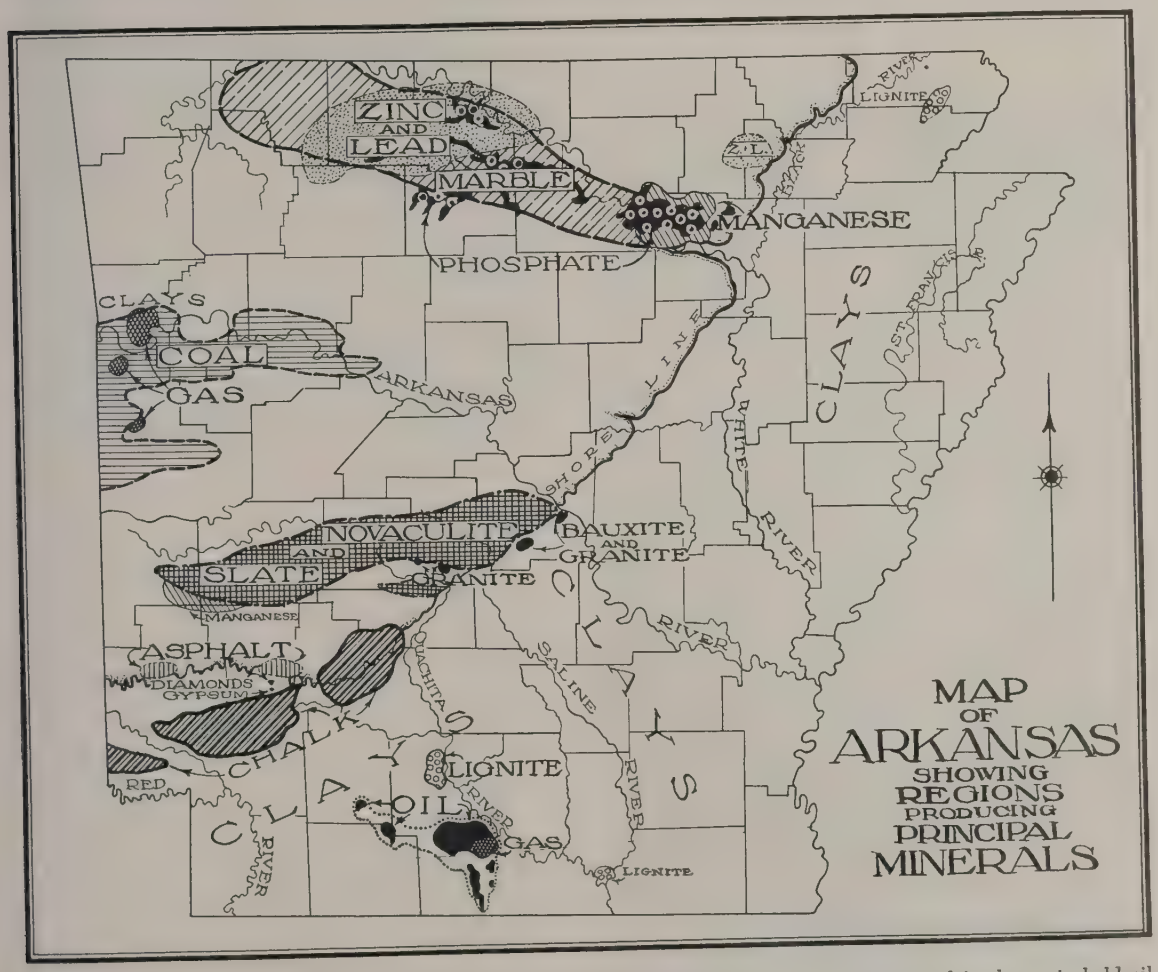
The following paragraphs will very briefly describe the mineral products of the state.

Petroleum—Petroleum is by far the most valuable mineral asset of the state, its present value being at least four times that of its nearest competitor—coal. Commercial production of oil began in the early months of 1921, soon after the bringing in of a commercial well near El

Dorado, Union county, on January 10, 1921. Extension of the El Dorado field and the discovery of the East El Dorado field followed rapidly. The development of the Stephens area in Ouachita and Columbia counties began in June 1921. Development began in the Smackover area on April 14, 1922, and commercial production began in southern Nevada county (Irma field) in September, 1922. The Smackover area is by far the largest of any of the producing areas, covering 33 square miles. Its present daily average production (week ending October 4, 1924) is 114,650 barrels, which is about ten times that of the second largest area—the El Dorado field.

There may be said to be five well-defined producing areas in Arkansas: El Dorado, East El Dorado, Smackover (including Louann), Stephens, and Nevada county (Irma field). These fields reached a collective daily average maximum production of 167,600 barrels for the week ending May 31, 1924. Production for the week ending October 4 was 130,250 barrels per day. This production now gives Arkansas the rank of the 4th producing state in the union, being exceeded only by California, Oklahoma and Texas. From January, 1921, to August, 1924, inclusive, Arkansas has produced approximately 106,781,460 barrels of oil, having a value of about $94,617,000. The oil produced comes from the Upper Cretaceous series of beds, and ranges in gravity from 14 to 36 degree Baumé. Smackover oil ranges from 18 to 28 degrees, and is classed as "light" and "heavy." At present 26 per cent of this is "light" oil, and ranges in gravity from 23 to 28 degrees Baumé.

The geology of the Arkansas oil fields is in many ways similar to that of the Louisiana producing areas. Drilling is accomplished by the rotary method, and the formations penetrated are sands, soft shales, gumbos and some limestone. The average depth of drilling in the El Dorado, East El Dorado, Smackover and Stephens fields is about 2150 feet; that in the Nevada county field about 1225 feet. The total producing area in the state is now about 52 square miles. Since it is reasonable to assume that probably from 8000 to 10,000 square miles of the Coastal Plain series of beds have a fair chance to hold oil accumulations, it is very probable that oil fields will continue to be discovered in Arkansas from time to time for many years to come.



Coal—The second mineral industry in Arkansas is coal mining, although the bauxite industry is not far behind in point of value of annual production. In 1922, 1,110,046 short tons of coal were produced, with a value of $4,592,000. The coal is classed as bituminous, semi-bituminous and semi-anthracitic, the ratio of fixed carbon to volatile matter varying from about 2.5 to 9.0. Of the coal produced, about 85 per cent is bituminous and semi-bituminous and 15 per cent semi-anthracitic. The coal fields are in the western part of the state and extend eastward

from Fort Smith for about 80 miles, following, roughly, the course of the Arkansas River. The semi-anthracitic area is in the eastern end of this belt. From Fort Smith they also stretch southward in a comparatively narrow band for about 36 miles. The area described embraces Sebastian, Scott, Franklin, Logan, Johnson and Pope counties. The entire field is thus somewhat L-shaped, and includes an area in which the beds are of workable thickness of 1620 square miles. The peak production of Arkansas was reached in 1907 with a production of 2,670,-438 tons, having a value of $4,473,693. There are about 50 mines in operation today, 12 of which are strip mines. Arkansas coal comes from the Pennsylvanian series of rocks of Carboniferous age from formations known as Savanna, Paris, Fort Smith, Spadra, Hartshorne and Atoka. There still remains a great amount of undeveloped territory in the coal belt. The presence in the state of

A 10-Foot Vein of Coal Near Fort Smith

coal beds of large extent is of importance and value to the coal-consuming industries.

Bauxite — The third industry of Arkansas from the standpoint of the value of its annual mineral production is the bauxite industry. Geologically, at least, this industry is unique to Arkansas in the United States, as the bauxite masses in Arkansas were formed by the alteration of granitic intrusions, the bauxite being located in two relatively small igneous areas in Pulaski and Saline counties. It is probable that the bauxite was originally formed by the action of steam and water upon the granite (syenite). In 1923, 495,117 short tons were produced in the state, having a value of approximately $2,985,000 at the mines. This represented 94.7 per cent of the United States production, although, due to importation of foreign bauxite, the proportion of Arkansas bauxite consumed in this country is considerably less than the above percentage. Bauxite is the only commercial source of aluminum. It

Bauxite Mining, Bauxite, Ark.

is also used in the chemical trades, in the manufacture of fire brick, and in the manufacture of such artificial abrasives as are derived from the dehydration of alumina. There are five plants in the state now engaging in the bauxite industry. The major portion of the bauxite mined is dried at the plants. It is shipped to refining and reducing plants out of the state.

Natural Gas—Arkansas produced approximately 9,-700,000,000 cubic feet of natural gas in 1922, with an estimated value of $1,798,000. There are, in general, two producing areas in the state: One, in the northwestern portion, in the vicinity of Fort Smith in Crawford, Sebastian and Scott counties, and the other in the southwestern part, in the east part of the Smackover area in Union county. The development of the Smackover oil field since 1922 has up to the present time added about 1,225,-000,000 feet of gas per day to the production of the Fort Smith district.

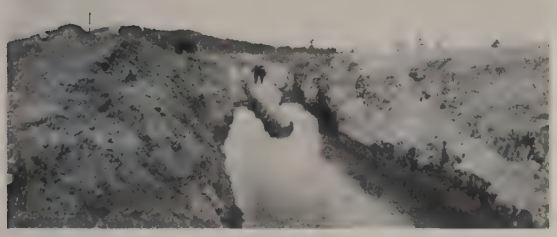
The Fort Smith District gas fields, which are confined to Crawford, Sebastian and Scott counties, are known as the Mansfield, Mazzard Prairie, Alma and Kibler fields, and derive their production from the productive coal measures of Carboniferous age. The rocks in that gas area are often folded into well-defined anticlines, while the Smackover production comes from the Coastal Plain series of beds, which provide little or no surface evidence of structural features.

Clays—Arkansas clay deposits are of sufficient size to make her one of the largest clay-product manufacturing states in the Union. There are abundant supplies of both the finer and coarser varieties of clay, the finer type, or kaolin clays, suitable for pottery manufacture being found in general in the Tertiary Coastal Plain area south of the Arkansas River and southeast of the Missouri Pacific Railroad, although the coarser clays are to be found there in abundance also. Other clay deposits are to be found along the Arkansas River west of Pulaski county in White, Cleburne, Faulkner and Van Buren counties. These latter deposits may be used for building, paving and fire bricks, drain pipes and tile. At the present time the clay-product industry in Arkansas is in a very undeveloped state. It is apparent that the quan-

tity and quality of clays are present in Arkansas, and there is adequate cheap fuel to be had for the burning of the clays. Furthermore, transportation facilities are good, and the losses to the clay-product industry due to freezing of the clay is almost eliminated due to the equable climate.

Diamonds—The only locality in which diamonds have been found in place in North America is in Pike county, Arkansas. The impression seems to prevail among those who do not live in Arkansas that the Arkansas diamond is but a semi-precious stone at best, such as is the "Hot Springs" diamond, or that it is perhaps some other mineral which has been locally exploited.

The fact remains that the Pike county diamond field has been a source of genuine diamonds since 1906. Incomplete records indicate that to 1922 at least 5300 stones



Diamond Mine, Pike County, Ark.

have been found. For the nine months, April to December, 1923, the tax records of Arkansas show that 1313.35 carats, valued at $6266.75, were extracted by the single firm now operating in the territory. The stones have varied in weights from a fraction of a carat to 40.23 carats. Most of the stones are white, brown or yellow in color. A well-known gem expert stated that certain Arkansas diamonds "are absolutely perfect and are equal to the finest stones found at the Jagersfontein mine, or that were ever found in India." It is interesting to note that the rocks in which the Arkansas diamonds occur bear a striking resemblance both in geological structure and in chemical make-up to those in which diamonds are found in the Kimberley mine of South Africa. As is well-known, the Kimberley diamond-bearing rocks are found in funnel-shaped volcanic necks or pipes which are filled with a mass of volcanic magma, known, in general, as intrusive peridotite, or more familiarly as kimberlite, or kimberlite tuff. The African stones are recovered from the decomposed peridotite.

The Arkansas peridotite closely resembles that of South Africa, and is, for the most part, similarly classed as intrusive peridotite, or kimberlite. In all probability the igneous material in which the diamonds are found forced its way up through the overlying Paleozoic and Lower Cretaceous rocks following what must have been violent explosions which shattered the surrounding rocks and brought deep-seated sedimentary rocks to the surface. The area in which the Arkansas peridotite is found does not exceed a total of a square mile, and, at the present writing, this is the only point in the state at which the diamonds have been discovered, although other intrusions of peridotite have been found.

It is interesting to consider that at the Kimberly mine excavation has taken place to a depth of 3600 feet into the volcanic material, whereas the Arkansas field has only been mined to a depth of a few feet. Future development will be interesting to follow.

Zinc and Lead—The lead and zinc producing areas of Arkansas are principally located along the southern flanks of the Ozark plateau. The ores are found in rocks of Ordovician and Silurian age. They occur as bedded deposits, vein and fault-line deposits, and alteration products. The production has been confined principally to Marion, Searcy, Boone and Newton counties—an area of about 2200 square miles. It is not at all unreasonable to suppose that this area may be extended to at least three times this amount and include portions of Yell, Baxter, Sharp and Lawrence counties. Until detailed mapping has been carried over the entire region it is not possible to predict what may be the ultimate extensions of the zinc and lead area.

The zinc production reached its peak in 1916 with a production of 6815 short tons, having a value of $1,826,420. The reported peak of the lead-ore production was reached in 1916 with a production of 382 short tons, valued at $65,704. The zinc and lead ores occur principally as sulphides. Zinc carbonate and silicate are usually associated with the sulphide and are derived from it. Due to overproduction during the war, the zinc and lead mining activity in the state is very slight at the present time. The fact remains, however, that there are in northern Arkansas enormous amounts of high-grade zinc and lead ores which await future development. Many of the mines are above the drainage and are cheaply operated.

Manganese—There are two producing areas in the state. The first is an area of about 100 square miles in Independence, Izard, Sharp and Stone counties. These areas contain ores of workable quantity and quality. The ore supply now available has been estimated at 420,000 tons. The second area is somewhat of a belt extending through Saline, Garland, Hot Spring, Montgomery and Polk counties, but it is doubtful whether the ores of this second belt can be worked profitably at the present time on account of the ore not being sufficiently concentrated. The Independence county ores consist principally of the different oxides of manganese—mostly psilomilane and braunite. The ores there occur as nodules of various size and are found in residual clays. These nodules were formed by the decomposition of a Silurian limestone. The manganese production in the state reached its maximum during the late war, 10,140 long tons being produced in 1917, having a value of $447,511.

Asphalt—There are eight deposits of asphaltic sand in Arkansas, four of which are in Pike county and four in Sevier county. These are found near the base of the Cretaceous series of beds. The asphaltic layers range in thickness from a feather edge to 12 feet. Asphalt has been mined from the deposit near Pike in Pike county. From 1903 to 1906 4815 tons were mined, valued at $22,368.

Chalk—Commerial chalk deposits are confined to Little River county. The chalk is exposed near White Cliffs Landing and at Rocky Comfort. The area at Rocky Comfort, over which the chalk is actually exposed, is estimated to be about 900 acres. At White Cliffs the chalk cliffs are about 150 feet high and the amount available there for the manufacture of uncalcined or calcined lime products, including Portland cement, has been estimated at 150,000,000 tons. These chalk deposits average from 75 to 93 per cent pure calcium carbonate.

Fuller's Earth—Fuller's earth has been mined to a considerable extent near Olsen in Saline county. Decom-

posed basaltic dikes there have produced material of excellent quality. Mining is not now going on.

Novaculites—Novaculite, known as "Arkansas Stone" or "Ouachita Stone," is unique to Arkansas in this country, and is found in steeply sloping beds making up the borders of the Ouachita Mountain system. The material has been used extensively in the manufacture of oilstones and whetstones, and is a very fine grained rock containing over 99 per cent silica. Crushed novaculite is also extensively used for railroad ballast.

Mineral Waters—Arkansas is well known for its mineral waters. In 1922 248,460 gallons of mineral waters were sold for $28,866. The state has an abundance of springs. Hundreds of flowing springs of variable qualities are to be found in the northwest half of the state through the Paleozoic area. The waters of Hot Springs claim primary place as a water of medicinal value in the state. The waters there are decidedly radioactive. There are 44 hot springs flowing collectively over a million gallons per day. The average temperature of the water is 135 degrees F.

Mammoth Spring, in Fulton county, is of such size that it is utilized for the generation of electric power, and 1220 horsepower is derived from this spring from two dams.

Building Stone—About 13 square miles of "granite" are exposed in the state, which is of great value as a building material. The rock is a syenite, with exceptional structural strength and weather-resisting qualities. A few quarries are now operating.

Outcrops of marble occur along the southern flanks of the Ozark Plateau. These can be traced for 2000 miles. The beds are workable and usually vary from 25 to 50 feet in thickness. At one locality the thickness is 155 feet. The marbles frequently are of light color and possess excellent structural qualities. The principal marble beds are known as the St. Clair and St. Joe marbles of Silurian and Lower Carboniferous age. The marbles have not been used as extensively as their excellent qualities would justify. Very little quarrying is now in progress.

Limestones are widely distributed through the Paleozoic area, and are found in the Lower Carboniferous, Devonian, Silurian and Ordovician rocks. They are suitable for building or burning purposes.

Slates are found over an area of 1300 square miles within the Ouachita Mountain district. Many of the slates are of workable quality and are to be found in various shades. Very little quarrying is in progress at the present time.

Road Materials—Arkansas is well supplied with road-making materials. Those best adapted are sandstones, chert (flint rock), novaculite and gravels. In many parts of the state road-making materials are of excellent quality, are abundant and widespread.

Fertilizers—Phosphates are found in three general localities in Arkansas, the principal one being in northwest Independence county. The phosphate is found along river courses in Stone, Searcy, Marion, Newton and Boone counties. Scattered deposits have been found in the southwestern part of the state, and also north and west of Hot Springs. These phosphates are not being utilized at the present time, although they are entirely suited for agricultural use.

Beds of gypsum, or land plaster, are found in Pike county, near Murfreesboro, in the Lower Cretaceous beds. These are suitable for the manufacture of plaster of paris or fertilizer. They are not being worked at the present time.

Agricultural marls are found through the Cretaceous region in southwest Arkansas, and are distributed through an area of some 400 square miles in Clark, Nevada, Pike, Hempstead, Howard, Sevier and Little River counties.

Greensand containing potash in commercial quantities has been found in the Cretaceous area of southwest Arkansas, notably along the Little River in Little River county. No use is now being made of these potash-bearing sands.

Miscellaneous Minerals—Silver, copper and antimony ores, glass and molding sands, lignite, ocher and other paint materials, soapstone, tripoli, graphite and various other minerals are to be found in Arkansas in commercial quantities, but at the present time are not being exploited to any great extent.

Arkansas is rich in mineral wealth. The mineral industry at the present time in the state is only partially developed. This has been due largely to lack of a complete and detailed survey of the mineral wealth of the state and to some extent to lack of publicity given to its mineral possibilities. It is to be expected that the development of the mineral industries of Arkansas will proceed in proportion to the detailed knowledge of its mineral resources and the publicity given that knowledge.

Water-Power—The streams of Arkansas, as estimated by the Interior Department, can be used to generate 125,000 horsepower, available 90 per cent of the time and 178,000 available 50 per cent of the time.

At present there are only three hydro-electric plants operating in the state, one on the Illinois Bayou near Russellville, which generates a maximum of 800 horsepower, and two on the Spring River, which is fed by Mammoth Spring, Fulton county, the upper dam supplying a maximum of 400 and the lower dam a maximum of 720 horsepower. The total of the developed hydro-electric power in the state at present is a maximum of 2020, which is but slightly more than 1 per cent of the horsepower estimated as available 50 per cent of the time.

A dam now is being constructed on the Ouachita River in Garland county, known as the Remmel Dam, which will generate approximately 2000 to 8000 horsepower. It will be used to supplement the load requirements of an established light and power company. This company plans to erect two more dams on the Ouachita River in connection with this first project. These three projects are expected to give practically complete control of the river and generate 80,000 primary and 80,000 secondary horsepower.

Two dams on the Little Red River are planned by a second firm. These, it is estimated, will generate an aggregate of 107,000 horsepower.

A third firm is engaged in the promotion of six water-power projects on the White River and its tributaries. Four of these have a collective total of 147,000 horsepower.

The water-power available from the drainage of the Ozark Plateau, the Boston Mountains and the Ouachita Mountains has long been neglected. Interest is steadily increasing, however, and it will probably be only a comparatively few years before the Ouachita, Arkansas and White rivers and their tributaries will be supplying the industries of Arkansas and nearby states with cheap electric power. It is probable that the drainage of the Coastal Plain can supply only a very small amount of hydro-electric power on account of the low relief of the country.

Other Things About Arkansas

By the public at large Arkansas is probably less known and less understood than any other state in the Union. Its resources in soil and timber and minerals are unusu-

ally large and easily susceptible of development. Much of the state is blessed with a climate exceptionally favorable to health and to business. Its people are warm-hearted and hospitable. They are full of enthusiasm for their state and the state is worthy of this enthusiasm.

By reason of its timber resources Arkansas will of necessity become a seat of large paper-making enterprises.

From the black diamonds of its coal mines to the brilliant, sparkling gems of its diamond mines there is a wide range of resources typified in these two extremes.

Many Eastern people have found it difficult to disassociate their idea of Arkansas from the old tales of the "Arkansas Traveler" and therefore have looked upon that state somewhat askance, doubting the claims made for its soil, its climate and other natural advantages. But Arkansas is worthy of all the praise that has been given to it by Governor McRae and State Geologist Branner in the foregoing pages. The facts which they have clearly and truthfully presented make further comment about Arkansas almost unnecessary.

ARKANSAS

Total Area, 53,335 Square Miles; Land, 52,525 Square Miles; Water, 810 Square Miles

	1880	1900	1910	1923
Population	802,525	1,311,564	1,574,449	1,816,287
Property, true value	$286,000,000	$604,218,000	¶$1,721,900,000	†$2,599,617,000
Manufactures:				
Capital	$2,953,130	$25,384,636	$70,174,345	*$138,818,000
Products, value	$6,756,159	$39,887,578	$74,916,367	‡$118,310,000
Mines, Quarries and Wells:				
Capital	.....	.....	$7,200,417	*$8,688,453
Products, value	.....	.....	$4,603,845	*$8,404,537
Cotton Manufacturing:				
Spindles, number active	2,015	9,700	7,264	14,156
Looms, number active	28	257	240	150
Cotton consumed, pounds	340,000	2,034,000	2,915,000	5,913,000
Cottonseed Oil Mills:				
Capital	.....	.....	$5,239,091	*$12,139,890
Products, value	$590,000	$3,188,812	$7,788,885	*$25,304,034
Furniture Manufacturing:				
Products, value	.....	$233,000	$975,000	*$3,200,000
Lumber cut, feet	172,503,000	1,595,933,000	1,844,446,000	†1,452,200,000
Mineral Products, value	$65,535	$2,383,500	$5,350,705	†$31,419,000
Coal mined, tons	14,778	1,447,945	1,905,958	1,400,000
Petroleum, barrels	.....	.....	.....	36,610,000
Bauxite Production, tons	.....	.....	.....	493,880
All Land in Farms, acres	.....	16,636,719	17,416,075	*17,456,750
Improved Land, acres	3,595,603	6,953,735	8,076,254	*9,210,556
Number of Farms	.....	178,694	214,678	*232,604
Value all Farm Property	.....	$181,416,001	$400,089,303	*$924,395,483
Value Farm Land	.....	$105,106,650	$246,021,450	*$607,773,440
Farm Products, value	$43,796,000	$79,649,000	$153,834,875	$287,000,000
Farm Crops, value	.....	$59,272,000	$112,129,000	$218,300,000
Cotton Crop:				
Bales, number	608,000	750,000	821,000	620,000
Tobacco Crop, pounds	.....	831,700	316,418	*267,050
Grain Crop:				
Corn, bushels	32,350,000	45,226,000	57,360,000	39,039,000
Wheat, bushels	1,356,000	2,689,000	1,209,000	770,000
Oats, bushels	2,749,000	7,039,000	5,692,000	6,187,000
Live Stock:				
Cattle, number	682,000	895,000	1,028,000	925,000
Sheep, number	247,000	257,000	144,000	81,000
Swine, number	1,565,000	1,713,000	1,519,000	952,000
Horses, number	146,000	254,000	255,000	218,000
Mules, number	87,000	175,000	222,000	328,000
National Banks:				
Resources	$779,490	$5,244,680	$30,294,004	$95,233,000
Capital	$205,000	$1,070,000	$4,155,000	$7,862,000
Deposits	$265,382	$3,102,315	$15,312,911	$63,820,000
Other Banks, deposits	$577,628	$4,597,891	$21,510,000	$134,400,000
Railroad Mileage	859	3,360	5,306	†5,033
Highway Expenditures	.....	**$681,934	††$1,522,696	$10,496,000
Public Schools, expenditures	$287,000	$1,369,800	‡‡$2,494,800	†$8,829,000
Assessed Value Property	$86,409,364,000	$201,908,783	$384,000,000	$605,082,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

Present and Future Possibilities of Florida

By Hon. Cary A. Hardee, Governor of Florida

If the progress and prosperity of the country depend upon its people, its climate and its soil, Florida is destined to take first rank among all the states.

Her people as a class are of the same general type as those of the other Southern states, than which, in energy, resourcefulness, courage and moral character, there has not yet been produced a finer type. They belong to the same class of people exactly as those who have builded in little more than half a century from the wreck and ruins of the most devastating war of history one of the greatest empires on earth.

Cary A. Hardee

Among the states Florida has only one competitor in climate. There both the heat in summer and the cold in winter are more intense than they are in Florida, often rising above 100 degrees in summer and falling below 25 degrees in winter. In that state the rainfall is so scant that irrigation is necessary to the production of all crops. In Florida the rainfall is reliable and abundant during practically all seasons.

In that part of Florida which lies below the same parallel the temperature seldom rises above 90 degrees or falls below 32 degrees, and during the hottest periods of summer, when other sections of the country are sweltering in intense humid heat, the air is always cooled by refreshing breezes from the Gulf, so there are few nights when some covering is not comfortable.

The Peninsula of Florida—particularly on the West and East coasts, with their innumerable bathing beaches and splendid hotel accommodations and hundreds of miles of hard-surface roads—is fast becoming as popular a summer resort as the mountainous sections of the Middle and Northern states.

No other state equals Florida in the variety, fertility and productivity of her soils, and in no other section of the United States can land be found that will produce so abundantly two or three crops a year with so little labor, nor can there be found anywhere land that will produce, with careful and industrious and intelligent cultivation, crops of a net value of from $200 to $1000 per acre that can still be bought at from $50 to $200 per acre.

Agriculture has always been and will continue to be the chief support of civilization. Florida, with her 250 different varieties of crops, fruits and vegetables, all of which grow well, is first of all an agricultural state. No other state equals her in this respect. Her citrus fruit crop last year, consisting, as it did, of more than 21,000,000 boxes, sold for enough to repay what the United States paid Spain for the whole territory which she purchased four times over, leaving a considerable margin to spare.

There was also shipped from the state during that year 100,000 carloads of fruits and vegetables, including cabbage, tomatoes, peppers, cucumbers, strawberries, pineapples and celery. It is said that Florida produces more potatoes than Maine and more celery than Michigan.

In one year Florida's 50,000 farmers put into the market $80,000,000 of crops from less than 2,000,000 acres of land, and kept on hand stock cattle worth $25,000,000, horses and mules worth $14,000,000, hogs worth $6,000,000, milk cows worth $2,500,000 and thoroughbred cattle worth approximately $2,000,000.

She has produced 17,000,000 bushels of corn in one year, 5,000,000 bushels of peanuts, 2,000,000 bushels of velvet beans, 3,500,000 gallons of syrup and 4,000,000 pounds of tobacco. These agricultural products were grown on 2,000,000 acres, and she has 20,000,000 more acres of the same type of soil undeveloped, about 4,000,000 acres of which lie in the far-famed Everglades, which consists of a muck deposit varying in thickness from two to eighteen feet deep. Most of this vast tract is below the 27th parallel, is nearly half as large as the state of Maryland and is more fertile than the valley of the Nile. It is being rapidly drained and is destined to be the market garden and the "sugar bowl" of the world.

She has in her waters more than 600 varieties of fish, and her fish and oyster industry—which is yet in its infancy—is worth more than $20,000,000 annually. And it is said that if all the oyster beds in the United States were exhausted, the oyster beds around Apalachicola and the few other Florida ports would produce, with intelligent and skilled development, an abundant supply for the needs of the entire nation.

It may not be generally known that the largest sponge industry in America is at Tarpon Springs on the West Coast of Florida. In this industry alone more than seventy-five vessels are engaged.

Florida is not usually classed as a mining state, but in one year her phosphate mines yielded $19,000,000 and her fuller's earth production yielded $1,600,000, and it is estimated that she has in reserve 212,000,000 tons of phosphate.

Her 500 sawmills turn out over one billion feet of lumber annually, the products of which are worth about $40,000,000. And she produces more naval stores than any other state.

Florida is not classed as a manufacturing state, yet the capital invested in her manufactories increased from $3,000,000 in 1880 to more than $200,000,000 in 1920, and the value of her manufactured products increased from $5,000,000 in 1880 to $200,000,000 in 1920.

Florida, with a population of only about 1,000,000, increased her highway expenditures from $400,000 in 1904 to more than $10,000,000 in 1922, her railway mileage from 518 miles in 1880 to 5000 miles in 1921, and her school expenditures from $700,000 in 1900 to $10,700,000 in 1923.

In 1910 Florida had 43 national banks with resources of $46,000,000, in 1922 she had 61 national banks with resources of more than $126,000,000 and in 1923 Florida's National Bank resources were over $156,000,000. In 1900 she had on deposit in her savings banks, private banks and trust companies $3,700,000. In 1923 these deposits had increased to $129,400,000. Total deposits in all banks in Florida in 1923 amounted to over $244,000,000.

In 1900 all kinds of property in Florida was estimated to be worth $355,700,000, which in 1922 had increased to $2,440,900,000. This was an increase of more than 586 per cent.

Is a low percentage of failures among farmers an index to a state's progress and prosperity? In 1923 the percentage of bankruptcies among farmers in Florida was 13.4 per cent below the average in the United States.

Florida, with her 20,000,000 acres of yet untouched fertile soil, her abundant rainfall, her 1200 miles of sea

coast, her rapidly growing cities, splendid schools and public libraries, her health-giving and restoring climate, her low death rate, her abundant game supply, her bathing beaches and golf links, her railroad facilities and hundreds of miles of hard-surface roads, offers unexcelled attractions and opportunities to the farmer, the stock raiser, the dairyman, the homeseeker and the capitalist. And these and many others are flocking to the state in ever-increasing numbers.

He would be reckless, indeed, who would undertake to place a limit to her developments in any direction, either in the immediate or more distant future.

Mineral Resources of Florida

By Herman Gunter, State Geologist, Tallahassee, Fla.

Florida is the second largest state in the Union east of the Mississippi River. Its generous area is comparable to the large and varied mineral resources within its borders. Within this state occur the most extensively developed phosphate fields in the world; widespread deposits of limestones and marls; clays, including fuller's earth and high-grade kaolin, as well as those used in the manufacture of building brick, hollow building tile, drain tile and pottery products; vast areas of peat and muck; building sands and gravel; gypsite; diatomaceous earth and abundant supplies of mineral and artesian waters. In the list of mineral resources the production of ilmenite, rutile and zircon from the beach sands on the Atlantic Coast is deserving of special mention.

Herman Gunter

Of the mineral products of the state, phosphate easily assumes first place, and Florida ranks first among all the states in production and value of this most important source of one of the three essential elements of plant food. The mining of phosphate and production on a commercial scale began on Peace Creek near Arcadia, the first shipments being made in 1888. It might be interesting to note that the grade of phosphate first produced, known as river pebble and in which the industry had its inception, is not mined at the present and only played a small part at any time in the total production of the state.

In 1888 the hard-rock phosphates were discovered, and in December, 1889, operations were begun near Dunnellon. The first shipments were made in April, 1890. Rapid development of this field followed, so that in 1894 Florida's production exceeded that from South Carolina, which up to that time had held first place. With the beginning of the production of the land-pebble phosphate, about 1890 the output increased so steadily and rapidly that Florida has easily maintained the position gained in 1894.

The phosphates of Florida might be divided into four varieties: the land pebble, hard rock, river pebble, and soft, the first mentioned now being the most important in point of production and total value. The soft phosphate, although known for years, has, in the process of mining the other grades, been lost. It did, however, receive for a few years the attention of many of the operators, being

Hydraulic Mining of Land Pebble Phosphate, American Agricultural Chemical Co.

separately handled and placed on the market as a distinct product. At the present time, however, no disposition is being made of this variety.

The year 1913 is referred to as the peak year in the production of phosphate from Florida. During this year there were produced 2,545,276 tons, valued at $9,563,084. The outbreak of the European War had a very depressing effect on the industry, since practically all of the hard rock and a large portion of the higher-grade pebble phosphate was exported. Following the declaration of war, therefore, not only curtailment of production but in many instances suspension of mining altogether was necessary.

Mining Hard Rock Phosphate, Franklin Phosphate Co.

Hard Rock Phosphate Washer, Cummer Lumber Co.

During 1920, however, the industry made a complete recovery and reported the largest output in its history. The production for that year amounted to 3,369,384 long tons, with a valuation of $19,464,362. Since 1920 the pro-

Land Pebble Phosphate Rock Washer

duction and value of output have not reached these figures, largely owing to the unsettled European conditions. With the restoration of more stable conditions abroad no doubt will come brighter prospects for the phosphate industry.

Large deposits of fuller's earth, a clay used principally for clarifying and filtering mineral, vegetable and animal oils and fats, occur in Florida and are mined in the northern part of the state in Gadsden county and in southern Florida in Manatee county. This clay was discovered in Gadsden county, and there the mining of the deposits began in 1895. According to the United States Geological Survey, this discovery was "entirely accidental, resulting from an attempt to make brick from clay found on the property of the Owl Cigar Company, near Quincy." It is needless to add that the attempt was a failure so far as making brick was concerned, but the similarity of the material to the imported fuller's earth was recognized and tests later proved it to be a fuller's earth of excellent quality.

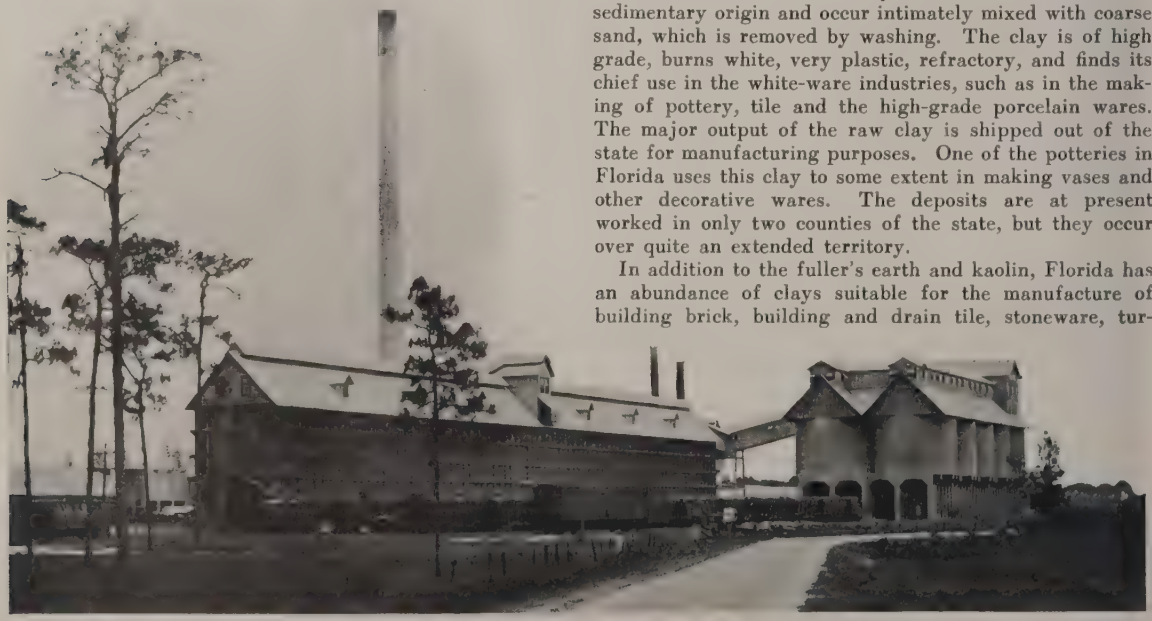
Previous to the mining of this earth in Gadsden county the fuller's earth used in the United States was imported. The Florida earth seems to be better adapted to the refining of mineral oils, and for a long time was used only for this purpose. The imported earths, on the other hand, are used in the refining of edible oils and fats. Rather extensive experiments have been conducted with domestic

Fuller's Earth Plant, Attapulgus Clay Co.

earths for the purpose of trying to overcome certain objectionable qualities attributed to them when used in refining the edible oils. Among these are the imparting of a disagreeable odor or taste to the refined product and the retaining of too great a proportion of oil in the spent earth. Very satisfactory results have been reported, and, in fact, some of the larger users of fuller's earth who conducted the experiments were so satisfied with results as to make them no longer dependent on imported earths for the refining of these oils. In the production of fuller's earth Florida is the leading state, as it has been since the beginning of the industry. The Southern states produce by far the greater amount of fuller's earth, and according to statistics for 1923 92 per cent of the output came from Florida, Georgia and Texas. The industry in Florida alone amounted to approximately $1,000,000 in 1923.

Florida clays second in commercial importance to the fuller's earth are the ball clays or kaolin. These are of sedimentary origin and occur intimately mixed with coarse sand, which is removed by washing. The clay is of high grade, burns white, very plastic, refractory, and finds its chief use in the white-ware industries, such as in the making of pottery, tile and the high-grade porcelain wares. The major output of the raw clay is shipped out of the state for manufacturing purposes. One of the potteries in Florida uses this clay to some extent in making vases and other decorative wares. The deposits are at present worked in only two counties of the state, but they occur over quite an extended territory.

In addition to the fuller's earth and kaolin, Florida has an abundance of clays suitable for the manufacture of building brick, building and drain tile, stoneware, tur-



CORONET PHOSPHATE CO., PLANT CITY, FLA.

pentine cups, as well as other clay products. Several brick plants are at present operating in various portions of the state, supplying to a large extent the demand for this structural material. With the rapid development of Florida there is a greater demand for these more permanent building materials, and it is predicted that this will give a stimulus to additional development of the clays for the

Plant of Edgar Plastic Kaolin Co.

various uses to which the different deposits are especially adapted.

Florida is essentially a limestone state, the oldest exposed formation being a limestone to which the name of Ocala has been assigned, from its typical occurrence in and near that city. Comparable to this formation in general appearance and chemical composition is the Marianna limestone, so well exposed near that city in western Florida. An impure or argillaceous limestone occurs along the Apalachicola River in the vicinity of River Junction. This limestone was at one time used in the manufacture of a natural cement. Vast deposits of more recent limestones occur in southern Florida, and are well developed

Ojus Rock (Oolitic Limestone) Plant of Maule Ojus Rock Co.

in the region about Palm Beach and Miami, as well as in the Everglades section. The deposits of coquina, a shell limestone, can be seen at different points along the east coast of Florida from the vicinity of St. Augustine southward for many miles. The coquina is of particular interest in that it has the unique distinction of being the first building stone used in America.

Of the mineral industries in Florida none, perhaps, has shown greater increase and activity in recent years than the limestone. To account for this it is only necessary to call to mind the large road-building program and the rapid progress that the state is making in highway construction. The limestones and shell marls are extensively utilized as road-making materials, as well as in building and other construction work. The value of the output of limestone for all purposes, such as road making, railroad ballast, riprap, concrete, building and agricultural purposes, and other minor uses, in 1913 was $156,589. In contrast to this are the figures for the 1923 production, which total $1,425,434, showing the extraordinary increase of 809 per cent.

In addition to the production of limestone for the various uses above mentioned, large quantities enter into the manufacture of quick and hydrated lime. The lime industry is centered about Ocala in central peninsular Florida, and has been since its beginning in 1884. In that part of the state excellent deposits of high-grade limestones, analyzing as high as 99.15 per cent calcium carbonate, occur. The lime manufactured in Florida enters largely into the construction work within the state, but little of it being shipped without its borders. On account of its purity, however, some is used in the chemical and other industries, and such as is used for those purposes is shipped to points in other states. The hydrated lime is not only used for inside finishing work, but there is an increasing demand for it from the agriculturist for use on soils. The finely ground limestone is also used for this purpose.

Deposits of limestone comparable in chemical and physical characteristics are present in other parts of Florida. There is no doubt about the development of these, as the demand for this product continues to increase.

Enormous deposits of peat and muck are found in many parts of Florida, the largest continuous bodies of which are in the Everglades and the region contiguous thereto. Smaller bodies, however, occur in practically every county of the state. In Europe peat is extensively used as a fuel, but in this country, so abundantly supplied with coal, crude oil and wood, peat has been unable to compete in this respect. It is known, however, that Florida peat compares very favorably with peat from other parts of the world so far as fuel value is concerned. Large quantities of Florida peat have been produced for use as a fertilizer filler and for agricultural purposes. These are the two chief uses made of peat in this state, although of recent years reported satisfactory fuel experiments have been conducted with certain deposits which give promise of future development.

Of greater consequence than is perhaps generally known is the sand and gravel industry. To many unfamiliar with Florida it is thought that the state is composed principally of sand. Certain sections give one that impression, but many sandy areas, in addition to their horticultural and agricultural value, are of economic importance on account of the deposits of sand. The Florida sands enter mainly into construction work, such as in mortar, concrete, artificial building stone and sand-lime brick. Some is also used for filtering purposes and, more recently to a limited extent, in the manufacture of glassware. Good deposits of gravel are worked in western Florida, this material entering mostly into the building of roads and other concrete work.

Diatomaceous earth, an abrasive material, was produced

Sand and Gravel Operations, Interlachen Sand & Gravel Co.

in Florida a number of years ago, and activity in this has been renewed during the past year. Although occurring in other parts of Florida, the best known deposits, and those that have been more or less developed, are in Lake county. The Florida earth is found in fresh-water lakes or the prairie-like bogs frequently bordering them. In its crude state it has a resemblance to peat, but upon drying out it is more of a grayish color than the darker color of peat or muck. This grayish color is imparted to the crude earth by the presence of organic matter. By the burning of the earth, however, this is removed and the resulting product is a very fine and light mass, consisting principally of the microscopic shells or tests of fresh-water diatoms, with practically no foreign material, such as sand or clay. The burned or refined product has a white to creamy color, and in physical appearance looks much like chalk, but chemically is entirely different, for chalk is calcareous, while diatomaceous earth is siliceous. The extreme fineness of grain makes this earth especially adapted for use as a polishing powder. It is also very light and porous, and these qualities render it a non-conductor of heat, thereby making it a good insulating and fire-proofing material. A number of other uses are known, and there is a demand for earths having the qualities that those found in Florida possess.

Gypsum has been known to occur in Florida for twenty or more years. The locality, however, where the larger deposits lie is very inaccessible, for the situation is in a very low area subject to periodic overflow. The principal deposits are in the Lake Panasoffkee region of Sumter and Citrus counties. From samples of this material it is seen that the gypsum is a fine, powdery mass, which under the lens reveals crystallization. The deposits are rather disconnected, occurring on several of the islands in the region named. Estimates of the available tonnage have been made of some of these, the larger estimate amounting to 360,000 tons, this being on Soapstone Island, and made by R. W. Stone of the United States Geological Survey.

Among the resources of Florida, and one the monetary value of which cannot be expressed, is its abundant supplies of pure, underground waters. In practically every section of the state limitless quantities of water can be obtained by drilling wells of moderate depth. In some sections flowing artesian wells can be had with pressure sufficient to supply water for all domestic purposes, as well as for irrigation and in some instances for power. Some of the largest springs in the world are found in Florida, these being but the natural outlets of the underground waters. One of these springs is of such volume of flow as to be the source of a stream sufficiently large to float steamboats, the boats being able to enter the spring basin itself. Other springs yielding waters of reputed medicinal properties occur in different sections of the state.

For a number of years ilmenite, rutile, zircon and monazite have been produced in Florida, this industry dating from 1916. These minerals are a constituent of the beach sands along the Atlantic Coast from Duval county south. The dredgings at the inlet north of Palm Beach indicate their presence in some abundance. They are recovered, however, at only one locality, Mineral City, Duval county.

The beach sands at Mineral City contain about 10 per cent mineral. Those of commercial importance, named in the order of their relative abundance, are ilmenite, zircon, rutile and monazite. In addition to these heavier minerals, garnet, kyanite, epidote and staurolite have been recognized. Attention, however, is mainly directed to the recovery of ilmenite, although shipments of zircon are increasing.

Florida is now one of the principal sources of ilmenite in the United States. This mineral is an iron-titanium oxide, and its occurrence in Florida is in intimate mixture with the beach sands from which it is separated. The refined product is a very fine, iron-black concentrate. The percentage of rutile is only about one-third that of the ilmenite. This is separated to some extent and put on the market as a distinct product. Both ilmenite and rutile are used in the metallurgical industries. Ilmenite at the present time finds it chief use in the manufacture of white titanium oxide for paint.

Bog iron ore and ocher occur in various parts of Florida, but the deposits are mostly of rather local extent. The largest known deposit of iron ore is in Levy county, about 10 miles west of Bronson, the county-seat. It is reported that during the Civil War the ore was smelted and used for various purposes. From an analysis of a composite sample it is shown that the ore contains 51 per cent metallic iron. Ocher has been produced in Florida on a commercial scale from one locality in Flagler county. Samples, however, have been obtained from many other parts of the state.

The total annual value of the mineral production in Florida is given for 1900-1923. The figures for 1923 are somewhat approximated, since complete returns from some of the industries are not available at present.

VALUE FLORIDA'S MINERAL OUTPUT

1900.....	$3,326,517	1918.....	$8,009,646
1910.....	9,284,705	1919.....	10,513,495
1914.....	8,621,688	1920.....	23,435,804
1915.....	5,035,010	1921.....	12,986,699
1916.....	5,859,821	1922.....	11,445,073
1917.....	7,534,834	1923.....	12,938,424

Florida as an Example

THE SITUATION in Florida is entirely unlike that in any other part of the country, except possibly to a limited extent in southern California. As the climatic advantages of southern California drew thousands of people seeking a mild winter climate to that section, so the climatic advantages of Florida, by the testimony of many who have tried both states, surpassing California's, has resulted in making Florida the winter home of many people of wealth in this country.

The number of these millionaires and multi-millionaires who, having visited Florida as tourists, are now taking an active part in its development, pouring millions of dollars into new enterprises, into the building of cities, into palatial homes and great resort hotels, makes a situation unique in this country. To a considerable extent this has been brought about by the enthusiasm of the Florida people for their own state. They are boundless in their praise. Language fails them at times to voice the enthusiasm which they feel. For years the people and the railroads alike have been advertising Florida far beyond anything which has ever been done by the people of any other Southern state. This publicity, carried on year after year, without regard to ups or downs, to good times or bad times, is now beginning to have the effect which all publicity of a similar character will inevitably have if the proposition advertised is worthy of it and if the publicity is continued persistently for a sufficient length of time. The harvest which Florida is beginning to reap from its publicity is only in its initial stage. What the future holds out is far greater than what has been accomplished. When in any individual business based on a solid foundation, or in the development of a state, there can be created a tireless enthusiasm and initiative, a self-reliance, a determination to conquer such as the people of Florida have for years shown, success will be inevitable.

FLORIDA

Total Area, 58,666 Square Miles; Land, 54,861 Square Miles; Water, 3,805 Square Miles

	1880	1900	1910	1923
Population	269,493	528,542	752,619	1,046,287
Property, true value	$120,000,000	$355,743,000	¶$936,885,000	†$2,440,491,000
Manufactures:				
Capital	$3,210,680	$25,682,171	$65,290,643	*$206,294,000
Products, value	$5,546,448	$34,183,509	$72,889,659	‡$145,821,000
Mines and Quarries:				
Capital	.....	.....	$20,794,901	*$58,067,662
Products, value	.....	.....	$8,846,665	*$8,976,413
Lumber cut, feet	247,627,000	788,905,000	992,091,000	†980,014,000
Mineral Products, value	$1,500	$3,326,517	$9,284,705	†$10,908,000
Phosphate mined, tons	.....	706,243	2,067,507	†2,018,809
All Land in Farms, acres	.....	4,363,891	5,253,538	*6,046,691
Improved Land, acres	947,640	1,511,653	1,805,408	*2,297,271
Number of Farms	.....	40,814	50,016	*54,005
Value all Farm Property	.....	$53,929,064	$143,183,183	*$330,301,717
Value Farm Land	.....	$30,823,016	$93,738,065	*$228,424,740
Farm Products, value	$7,439,000	$18,309,000	$43,689,425	$88,700,000
Farm Crops, value	.....	$13,498,000	$33,217,000	$73,300,000
Cotton Crop:				
Bales, number	55,000	50,000	59,000	12,000
Tobacco Crop, pounds	.....	1,125,600	3,505,801	4,292,000
Grain Crop:				
Corn, bushels	3,522,000	4,156,000	8,190,000	10,250,000
Oats, bushels	436,000	378,000	680,000	396,000
Live Stock:				
Cattle, number	451,000	751,000	845,000	871,000
Sheep, number	106,000	125,000	114,000	64,000
Swine, number	287,000	464,000	810,000	633,000
Horses, number	23,000	43,000	46,000	37,000
Mules, number	9,000	14,000	23,000	43,000
National Banks:				
Resources	$312,334	$9,642,703	$46,183,821	$156,391,000
Capital	$100,000	$1,155,000	$5,760,000	$8,990,000
Deposits	$157,202	$6,435,441	$26,086,580	$114,793,000
Other Banks, deposits	$287,289	$3,714,831	$20,837,000	$129,483,000
Railroad Mileage	518	3,299	4,432	†5,283
Highway Expenditures	.....	**$437,184	††$2,280,255	$19,876,000
Public Schools, expenditures	$115,000	$765,800	‡‡$1,584,000	†$9,769,000
Assessed Value Property	$30,938,309	$96,686,954	$165,000,000	$445,103,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

Georgia's Hydro-Electric Development

In the article on Hydro-Electric Power Development elsewhere in this publication, the figures as to the hydro-electric plants of the Georgia Railway & Power Company are given as furnished by that company, but a later letter from H. M. Atkinson, chairman of the company, gives revised figures received after the article had been printed. He writes: "While I understand that these figures were furnished you by our people, the installed horsepower capacity of the hydro-electric plants of this company, including the plants under construction as of January 1, 1924, should be stated as 308,200 instead of 244,000 horsepower. The difference is due to the fact that the three new developments now under construction in the Tallulah and Tugalo rivers were omitted from the figures showing the installed capacity, including plants under construction as of January 1, 1924, previously furnished you. These plants were in process of construction on January 1 and should be included."

Georgia has potential power resources of 958,000 horsepower available 50 per cent of the time. The principal developments have been made by the Georgia Railway & Power Co., the Central of Georgia Power Company and the Columbus Power Company. Their installed capacity, including plants under construction as of January 1, 1924, being:

	Horsepower
Georgia Railway & Power Company	308,200
Central of Georgia Power Company	24,000
Columbus Electric & Power Company	150,000
Total	482,200

These developments are located on the Tallulah, Tugalo, Chattahoochie and Ocmulgee rivers. There are in addition eight or more hydro plants in different parts of the state with a total capacity of approximately 50,000 horsepower, making a total of 532,000 horsepower which will be in public utility service within the next few years on the interconnected systems of the state.

In addition, the Mathis and Burton reservoirs, impounding 6,600,000,000 cubic feet of water, have been constructed on the Tallulah River. Construction is under way, which will make a total of six power plants on these rivers. These plants provide for a complete development of the Tallulah and Tugalo rivers for a distance of 38 miles.

Georgia—The Empire State of the South

By Hon. Clifford Walker, Governor of Georgia

In spite of the boll weevil and its destructiveness; in spite of the leanness of 1923; in spite of a loss of $70,000,000 a year, 1919-1923, by reason of the pestiferous pest mentioned, Georgia is unchallengeably "The Empire State of the South."

In Georgia's three geographical divisions—north, middle and south Georgia—homeseekers will not fail to find the ideal climate they have been picturing in their minds. They will find the idealistic soil for which they have been longing and sighing all the past years of their lives. They will find an annual average temperature that will cause them to shout for joy. They will find the rainfall made to order—meeting conditions joyfully according to the requirements of seeding time, time for cultivating the crops, time for harvesting crops. They will find the water supply for all purposes abundant and as pure as abundant.

Homeseekers who have eyes to see and minds free from prejudice will be unspeakably astonished when convinced as to the productivity of Georgia soil in the matter of the leading crops of the United States. Convincing evidence of the fact just cited may be and will be shown on every hand.

North Georgia

Do homeseekers wish to live in a section where the winter is cold but not severe; where the summers are warm but not hot; where wheat and corn, oats, rye and barley, Irish and sweet potatoes, onions, alfalfa and the clovers, tobacco and cotton, peaches and apples, strawberries and dewberries, etc., yield, under good-sense treatment, the finest of choice crops, in gratifying abundance—in abundance and to spare—let them locate in north Georgia—surpassingly beautiful on account of her mountains and valleys.

If one be interested in livestock farming, he will find in north Georgia a region admirably adapted to that inviting undertaking.

The mineral wealth of this section of the state has not yet come into its own, for it is not fully appreciated. It awaits the touch of the developing hand of capital and wisely directed energy. That wealth is as varied as it is great and inexhaustible. Georgia has 44 of the 52 merchantable minerals.

Middle Georgia

Middle Georgia is the happy mean. Within its prescribed boundaries are to be found the essential elements which lend attraction to the two sister sections. The soil, climate and annual average temperature bespeak a wealth-producing country. Exceedingly few crops only can be named that will not find prompt and profitable response in middle Georgia. It is a pasture land; therefore, the center of the livestock industry; its clays are a source of wealth, and its mineral springs supply health-protecting waters.

This is the land of the peach, of the Georgia yam and the triumphant Georgia collard. The entire country abounds in streams, large and small—navigable some of them; others utilizable for the smaller industries of a certain character.

Homeseekers who prefer conservatism in weather and in living, in methods of business and agricultural possibilities, etc., will find in middle Georgia conditions that will meet the views and wishes of the most critical and exacting in the matter of the selection of a land in which to dwell in comfort and ever-increasing delight.

South Georgia

Here the homeseekers will find the land that flows with milk and honey. This is the section of Great Georgia, where "December is as pleasant as May." Soil, annual average temperature, productivity as to all crops and livestock, water, etc., cannot possibly be surpassed in features which control when one is seeking a country in which he may work afield in his shirt sleeves every month in the year. It is a fact that, beautiful and attractive as south Georgia is, it awaits development along sundry lines—agricultural and industrial. Language fails one, accustomed to care in one's utterances descriptive of a country, when one undertakes to tell a story of south Georgia's marvelous make-up. The latter real, not artificial. Only recently have been discovered soils in unlimited quantities producing the finest tobaccos in the world.

The entire state, wonderful to behold and exceeding fair to look upon! The people are among the most cultured and refined in this great Union of great states. The life race here is not for dollars as dollars, but for a comfortable competence and for a life, not lost in selfishness, but of increasing usefulness, helpfulness and happiness.

"But cotton is your only crop!" you exclaim. Not so. The respectful reply to your somewhat natural exclamation is a statement of fact, to wit: The annual average farm value of Georgia corn, oats and wheat, eleven years, 1913-1923, was 51.3 per cent of the annual average value of Georgia's cotton crop during that period. The annual average farm value of Georgia's corn, oats and wheat, seven years, 1913-1919, boll weevil and high-priced cotton, was 46.8 per cent of the annual average value of Georgia's cotton crop during those years. There you have the story of crop diversification and livestock farming in Georgia—a policy and a practice successfully followed by the fathers during the fifties. Come and see!

Monument erected by the Colonial Dames and by the Society of Colonial Wars in the State of Georgia on Bloody Marsh, St. Simons Island, Ga., where the victory of the English was the turning point and settled the question of whether this territory should be Spanish or English.

The Mineral Resources of Georgia

What Has Been Done in the Way of Development and the Raw Materials Awaiting Further Development.

By S. W. McCallie, State Geologist, Atlanta, Ga.

Georgia has probably as great a variety of commercial minerals as any state in the Union. This diversity of minerals is, in a measure, accounted for by the diversity in geological formations. With only one or two exceptions all of the great time divisions of geological history are represented in the rocks of Georgia. In the southern part of the state, known as the coastal plain, occur rocks ranging in age from the Cretaceous to the most recent. To the north of this area, comprising the Piedmont Plateau and Appalachian topographic divisions, are the crystalline and metamorphic rocks, varying in age from lower Cambrian to Archean, while still further to the north and west, forming the Appalachian Valley and the Cumberland Plateau, are the unaltered Paleozoic, ranging in age from Cambrian to Carboniferous.

S. W. McCallie

The commercial minerals which have so far been exploited to a greater or less extent in Georgia are here described briefly in alphabetical order.

Asbestos

The amphibole variety of asbestos, a mineral used mainly in covering steam pipes, boilers, etc., to prevent heat radiation, is widely distributed throughout the Piedmont Plateau, where it occurs associated with dark-colored igneous rock in the form of irregular veins or pockets of variable sizes. The main production of asbestos so far has come from the Sall Mountain mine in White county, near Cleveland, and from the Hollywood mine in Habersham county, near a station by the same name (Hollywood) on the Tallulah Falls Railroad. From 1894 to 1908 the Sall Mountain mine, which has since in a large measure been exhausted, contributed the main part of the total production of asbestos in this country. These two mines are the only asbestos properties so far operated in the state; nevertheless, there are many prospects, not only in White and Habersham counties, but also in Rabun, Towns, Lumpkin, Hall, Cherokee, Jackson, Morgan, Walton, Paulding, Campbell, Coweta, Troup, Meriwether and other counties. Many of these prospects undoubtedly could be profitably developed.

Barytes

The value of the barytes output of Georgia now exceeds that of any other state. The entire production is from Bartow county in the vicinity of Cartersville. Five large plants are at present operating in this district. In addition to Bartow county, minor deposits occur in isolated localities in six other counties, namely, Polk, Floyd, Cherokee, Gordon, Murray and Whitfield. The Bartow county deposits are pretty well exploited and have now probably reached their maximum production. Only the crude and ground barytes is shipped. No attempt so far has been made in Georgia to manufacture barytes into lithopone or other products for which it can be used. This phase of the barytes industry seems to offer a promising return for the investors.

Bauxite

The first bauxite found in America was discovered near Hermitage, Floyd county, Georgia, in 1887. Later deposits were discovered in Polk, Bartow, Gordon and Walker counties. Between 1907 and 1915 deposits were also found in McIntyre, Wilkinson, Sumter, Stewart and Meriwether counties. The most extensive deposits so far developed are those in Sumter and Wilkinson counties in South Georgia, where the bauxite occurs in the form of well-defined beds. The deposits in Floyd and other counties in the northwest part of the state occur mainly in the form of pockets and are, therefore, of limited occurrence. Unless new deposits are found, which is quite likely especially in south Georgia, the peak of production of high-grade bauxite has probably already been reached. This statement, however, does not apply to low-grade ores, which exist in large quantities. Bauxites of this class seem to offer an excellent opportunity for the manufacturer of fire-brick and high-grade refractory materials as well as to the manufacturer of other ceramic products. The bulk of the high-grade ore now put on the market is used in the making of alum and the metal aluminum.

Cement

Limestones, shales and clays suitable for the manufacture of Portland cement are widely distributed throughout northwest Georgia and also in certain localities in south Georgia. In the former area two plants with a daily capacity of about 1500 barrels each are now in operation, while in the latter area a third plant of 2000 barrels capacity is being constructed and will be in operation in a short time. The total annual production of these three plants when in full operation will approximately equal the amount of the annual consumption of Portland cement in the state. The most promising outlook for the cement manufacture in Georgia at present appears to be that of white Portland cement. For this grade of cement there is an abundance of suitable raw materials in the form of high calcium white marbles and white clays.

Clays

The clay deposits of Georgia are one of its greatest mineral assets. In the southern part of the state, known as the coastal plain, occur the Cretaceous and Tertiary white sedimentary clays. The great thickness and extent of these beds and the purity of the clays themselves are probably nowhere duplicated in the country. These clays, which are now being mined by several large plants, are used mainly in the paper industry, though much of it finds its way into the pottery industry. The white sedimentary clays of South Georgia seem to offer an excellent opportunity to capitalists for the erection of plants for the manufacture of china, electrical porcelain, high-grade refractories, white-faced brick, etc., none of which products are now manufactured in Georgia.

Scarcely less important are the alluvial and residual

South Georgia Clay-Mining Plant.

clays and shales of north Georgia, which are suitable for the manufacture of building brick, roof tiling, etc.

Coal

The coal deposits of Georgia are confined to Sand, Lookout and Pigeon Mountains in Dade, Walker and Chattooga counties in the extreme northwestern part of the state. These deposits form a part of the northern extension of the Coosa and the Warrior coal fields of Alabama. The Durham Coal & Iron Co.'s mine, located on Lookout Mountain, is the only coal mine now operated in the state. The coal from this mine has a high heating value and is used largely for steam and coking purposes. The total coal area of Georgia is approximately 170 square miles, estimated at 933,000,000 short tons, less than 15,000,000 tons of which have been mined to the present time.

Copper

The most extensive copper deposits so far exploited in the state are those of Fannin, Cherokee and Haralson counties. No mines are at present operated. The deposits of Fannin county are in the extreme northern part of the state in the immediate vicinity of the well-known copper-mining district of Tennessee. These deposits in the past have furnished a large amount of ore to the Ducktown smelters. The Cherokee deposits have been worked at one place only, namely, the Canton Copper mine, one mile south of Canton. The Haralson copper deposit, known as the Waldrop mine, which has produced some copper, is near the Haralson-Polk county line, three miles northwest of Draketown. In addition to the copper deposits above referred to, deposits which seemed to be of importance occur also in Lincoln, Lumpkin and other counties in the northern part of the state. While the copper deposits of the state do not at present seem to offer such a promising outlook for investment as do many other minerals, nevertheless some of them will, in the future, no doubt become profitable producers.

Corundum

There seems to be a fair chance for successful commercial development of corundum in Georgia. From 1880 until 1892 Georgia was one of the chief producers of corundum in this country. The mineral is known to occur in many counties in north Georgia. The main production so far has been from the Laurel Creek mine in Rabun county, which is now inactive. All of the different varieties of corundum are found except emery. The principal variety is the non-transparent massive corundum, although a few gems of sapphires and rubies have been found in both Towns and Rabun counties.

Feldspar

The feldspars are widely distributed throughout north Georgia. They occur in pegmatite dikes of various sizes, associated with mica and quartz. The only place where feldspar has been mined in quantity is near Hiram, in Paulding county. A limited quantity has also been mined in White and Rabun counties. The Georgia feldspars so far put up on the market are potash feldspars and were used during the World War for fertilizer purposes after the potash had been made soluble by chemical treatment. There seems to be little doubt that ample feldspar can be found in Georgia to supply any ceramic industries which may hereafter develop in the state.

Fuller's Earth

The best known deposits of fuller's earth occur near Dry Branch, Twiggs county, and in the vicinity of Attapulgus, Decatur county, at which points they have been extensively mined for several years. Large deposits are also found in Bibb, Stewart, Columbia and other counties in the coastal plain. Georgia now stands second in the production of fuller's earth, Florida being first. Fuller's earth is used mainly in the refinement of mineral and vegetable oils.

The fuller's earth deposits of the state are so very extensive that they can meet almost any demand for increased production.

Fuller's Earth Mine, Twiggs County, Ga.

Gold

Gold has been mined in Georgia since 1829. As early as 1838 the output of the mines had become so important that the Federal Government established a mint at Dahlonega. The total gold production of the state to date has been approximately $20,000,000. The deposits occur in a number of narrow belts traversing the northern part of the state is a northeasterly-southwesterly direction. The most important belts are known as the Dahlonega and Hall county belts. Other belts on which are located important mines traverse Lincoln, Columbia, McDuffie and Warren counties. The output of the mines since the World War has been negligible by reason of the high cost of labor and the low purchasing value of the gold dollar. A revival of the gold-mining industry of Georgia seems to be at present largely a question of economic mining and successful treatment of low-grade ores at minimum cost.

Granite

The granite industry of Georgia is one of very great importance and offers opportunities for further development. Granite suitable for both building and monumental purposes is widely distributed over the Piedmont Plateau. One of the most interesting and also one of the largest barren granite masses in the country is Stone Mountain, near Atlanta, on which is now being carved the great Confederate Memorial, a stupendous undertaking, the

like of which has never been undertaken by man. The main seats of the granite industries at present are Stone Mountain, Lithonia and Elberton. Stone from the last-named locality is used largely for monumental purposes and is considered equal to the Vermont granite in uniformity of color and texture, as well as in durability.

Iron Ore

The main commercial iron ores of Georgia are the brown ores, or limonites, and the fossil ores, or hematites. Magnetite also occurs, but so far has not been developed. The brown ores are most abundant in Bartow, Polk and Floyd counties, but workable deposits are also found in nearly all the counties in the northwestern part of the state. These ores occur in irregular deposits or pockets in the residual clays and are very variable in size. Some of the large deposits in the vicinity of Cedartown in Polk county have been worked on a more or less extensive scale for ten years without exhausting the supply.

The fossil or hematite ores are confined to Dade, Walker, Chattooga and Catoosa counties. These ores belong to the Red Mountain iron-ore-bearing series, which are so well developed in the Birmingham district. They occur in continuous beds, varying from a few inches to three feet or more in thickness. Some idea may be had of the abundance of the fossil ores of the state when it is stated that the aggregate length of the outcroppings of the beds is approximately 175 miles, and that in many cases the ores can be worked to a depth of several hundred feet. It has been estimated that Georgia has more than 100,000,000 tons of fossil iron ore still unmined.

Limestone

Limestone suitable for lime, Portland cement, fluxing and building purposes occurs in great abundance in northwest Georgia. The most extensive of these calcareous formations is the Knox dolomite, a magnesian limestone of very great thickness. This formation furnishes much of the lime used in the state, as well as a large amount of stone for concrete aggregate and for general building purposes. Other calcareous formations of scarcely less commercial importance are the high-calcium Bangor and Chickamauga limestones. In addition to these, extensive beds suitable for Portland cement, for lime and for agricultural purposes occur in the Tertiary formations of south Georgia. Only one lime-producing plant is at present operated in the state, the output of which is much less than the state's consumption. This fact would seem to indicate that there is a promising outlook for further development of the lime industry of the state.

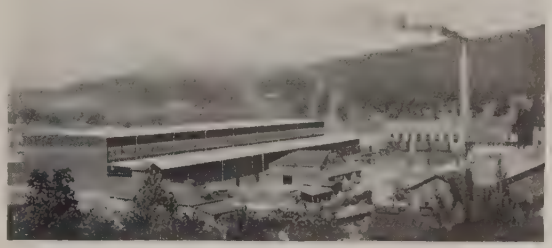
Manganese

The manganese ores, like the brown iron ores, are confined chiefly to Bartow, Floyd, and Polk counties. The largest and most productive deposits are found in the vicinity of Cartersville, where they occur in the residual clays derived from the Beaver limestone and the Weisner quartzite. These deposits have been worked more or less continuously for more than a half century and have produced a large amount of high-grade manganese ores, which, during the early workings, was shipped to England. Much of the high-grade ores are now worked out, but there still remains a large tonnage of ore carrying from 15 to 35 per cent metallic manganese. This class of ore occurs in large quantities and seems to offer an opportunity for more extensive exploitation.

In 1923 there were 23 producers of manganese ores in Georgia. The total tonnage was 31,750, valued at $147,226. The greater part of this output carried less than 35 per cent manganese.

Marble

The value of the output of Georgia marble now exceeds that of any state except Vermont. The center of this industry is located in the vicinity of Tate, Pickens county, although there are important quarries at Whitestone in Gilmer county. These marbles occur in a narrow belt which parallels the Louisville & Nashville Railroad from near Ball Ground in Cherokee county to the Georgia-North Carolina state line, a distance of 60 miles. In the vicinity of Tate the deposits attain their greatest thickness, where several of the quarries have reached a depth of more than 100 feet without reaching the extent of the deposit. The Georgia marbles now put on the market by the Georgia Marble Company have usually a coarse texture, but admit of a very fine polish and are admirably suited for both building and monumental purposes. In color the marbles are white or gray, though often they are banded with black. A flesh color also occurs.



New Plant of the Georgia Marble Co., Tate, Ga.

At present only three marble companies are operating in Georgia. The aggregate output of these companies last year was 56,230 short tons, valued at $2,090,486. The product of the Georgia quarries is shipped to every state in the Union, where it is used in constructing and decorating costly buildings. The state Capitols of Rhode Island and Minnesota; the United States Government building, Boston; St. Luke's Hospital, New York; Corcoran Art Gallery, Washington; Field Museum of Natural History, Chicago, and numerous other buildings throughout the country are made wholly or in part of Georgia marble.

The stone is also widely used for monumental purposes and for statuary. The statue of Lincoln in the Lincoln Memorial at Washington is made of Georgia marble. In addition to the uses above mentioned, the Georgia marble has a rather extensive use in the manufactory of terazzo and other ground products.

The Georgia marble industry is now only in part developed, and the output can unquestionably be greatly increased by further expansion.

Mica

Mica is widely distributed throughout the Piedmont Plateau. It has been worked to a greater or less extent in Upson, Cherokee, Lumpkin, Union, Hall and Rabun counties. Some of the most promising prospects in Cherokee county are in the vicinity of Holly Springs and Toonigh, and in the Hickory Flats district, about ten miles southeast of Canton. The Lumpkin and Union county deposits so far developed occur along the Lumpkin-Union county line. Upson county in the last few years has become a very active producer, having put on the market a large amount of very high-grade mica. The Kell Mica mine in Rabun county, ten miles east of Clayton, and a

mine in the suburbs of Gainesville, Hall county, have produced merchantable mica.

The large number of undeveloped mica prospects in the Piedmont region would seem to warrant further development of this industry.

Ocher

The ocher mines of Georgia produce approximately one-half of the yellow ocher used in this country. These mines are located near Cartersville, Bartow county, where they have been successfully operated for many years. In 1890 the Georgia-Peruvian ocher plant became a producer, and later three other plants were put in operation. The ocher deposits are confined to a narrow belt about eight miles long and less than two miles wide. The output of these mines was formerly exported to England and Scotland, but it now finds a ready market in this country, where it is used in the manufacture of linoleum, oilcloth, paint, etc.

Precious Stones

A large variety of minerals suitable for gem materials and other ornamental objects and cabinet specimens have been found from time to time in the state. No systematic prospecting for gems, however, has been carried on, and the finds have been accidental or incidental to the mining of gold, corundum or other minerals. There is a fair chance of locating materials of this kind in Georgia. Nearly all of the gem or semi-gem materials so far discovered have been found in the Piedmont Plateau. The most important gem stones found in the state are as follows: diamond, ruby, sapphire, amethyst, rose quartz, rutilated quartz, smoky quartz, agate, jasper, opal, beryl, garnet, rutile and moonstone.

Pyrites

The recent introduction of cheap sulphur from Louisiana has put the pyrites industry out of business in Georgia. This mineral occurs in commercial quantities in the northern part of the state. The most important deposits are those of Lumpkin, Cherokee, Paulding, Cobb, Douglas, Haralson, Carroll, Towns and Rabun counties. Previous to the introduction of cheap sulphur the following pyrites mines were operated on a more or less extensive scale: The Chestatee mine, six miles northeast of Dahlonega, Lumpkin county; the Southern mine, near Creighton, Cherokee county; Little Bob and Shirley mines, near Hiram, Paulding county; the Marietta mine, near Marietta, Cobb county; the Sulphur Mining & Railroad Company's mine in Douglas county and the Waldrop mine near Draketown, Haralson county. In addition there are many prospects in other counties which could be developed into profitable mines. In the event of increased price of pyrites in the future Georgia will again become an active producer.

Serpentine

The only deposit of serpentine worked so far occurs at the Verde Antique Marble Quarry in Cherokee county, about two miles southwest of Holly Springs. The stone is used almost exclusively for interior finishing and for decorative purposes. It is especially well suited for stairways, corridors, mantels, pedestals for statuary, soda founts, etc. The Verde Antique Quarry has not been operated since the World War. The stone occurs in large quantities, and there appears to be no reason why the quarry should not be again put in operation.

Slates

Slate deposits of Georgia occur in Polk, Bartow, Gordon and Murray counties. In the first-named county, in the vicinity of Rockmart, they were extensively worked some years ago for roofing purposes. These slates, known as the Rockmart slates, have a dark blue or black color and are found in two areas, one extending from a point about three miles south of Cartersville to five miles south of Rockmart, and the other area occurring a few miles south of Cedartown. The Gordon and Murray slates, which have a green color, reach their best development in the vicinity of Fairmount, where they were formerly exploited for roofing slates, but are now extensively mined and ground for composition roofing. Both varieties of slates here described seem to offer a fair opportunity for the development of a profitable slate-roofing industry.

Talc

Talc and soapstone occur in a large number of places in north Georgia. Talc mines have been operated in the vicinity of Chatsworth, Murray county, for many years. Formerly four plants, were operated in this district, but at present there is only one producer. Talc has also been mined near Mineral Bluff, Fannin county, and near Ball Ground and Holly Springs, Cherokee county. The output of these several mines has always been of a fair grade and has found a ready market. Much of the production has been sold in a rough state, but a considerable amount of the output has been manufactured into pencils, gas tips, etc., or sold as a ground product. The talc industry of the state warrants further development.

In addition to the various minerals above discussed, there are other commercial minerals which cannot be described in the limit of this article, namely: Sericite, chlorite, tripoli, marls, etc.

Value of Mineral Resources of Georgia, 1922

Asbestos, coal and coke	$ 320,807
Barytes	468,517
Bauxite	231,225
Brick and tile	4,141,688
Clays	850,072
Fuller's earth and manganiferous ores	986,535
Gold and silver	3,588
Granite	1,057,823
Iron ores	77,636
Limestone	424,242
Marble	1,867,228
Mica	11,330
Mineral waters	36,856
Portland cement and slate	1,184,480
Pottery	15,913
	$11,677,940

In conclusion, I would add that the mineral resources of Georgia as a whole have at present only reached the beginning stage of development, namely, the mining and the marketing of crude ores. Scarcely anything whatever has been done toward the manufactory of the crude ores into commercial products. The iron ores, manganese, bauxite, barytes, ochers, clays, etc., are all shipped out of the state in a crude form. If these materials were manufactured into finished commercial products it would increase the value of our mineral products many fold.

Water-Powers

The water-powers of Georgia are without doubt the greatest natural resource that comes under the investigation of the State Geological Survey. Data recently published by this department shows that the streams of Georgia have an aggregate of 1,743,650 horsepower, based on

net 10 horsepower at low water. Of this enormous power only 262,148 continuous horsepower, based on the water-wheel capacity then installed, had been developed. Subsequent to the published data referred to, there have been something like 100,000 additional horsepower developed, which makes the total horsepower developed to date approximately 362,148. The aggregate horsepower given (1,743,650 horsepower) is based on the low water average without storage. In case storage was taken into consideration the total water-power would be two or more times greater than this estimate. In view of the fact that there is a profitable market for the output of the power, there would seem to be an encouraging outlook for investment in water-power development in Georgia.

GEORGIA

Total Area, 59,265 Square Miles; Land, 58,725 Square Miles; Water, 540 Square Miles

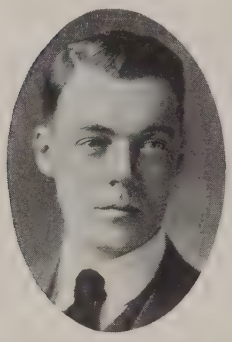
	1880	1900	1910	1923
Population	1,542,180	2,216,331	2,609,121	2,999,196
Property, true value	$606,000,000	$936,000,000	¶$2,163,033,000	†$3,896,759,000
Manufactures:				
Capital	$20,672,410	$79,303,316	$202,777,665	*$448,700,000
Products, value	$36,440,948	$94,532,368	$202,863,262	‡$381,296,000
Mines and Quarries:				
Capital	.....	.....	$11,475,710	*$6,181,870
Products, value	.....	.....	$2,874,595	*$4,071,152
Cotton Manufacturing:				
Capital	$6,349,000	$24,158,000	$64,651,000	*$150,191,000
Products, value	$6,482,000	$18,458,000	$48,037,000	*$192,186,000
Spindles, number active	198,656	815,545	1,871,389	2,682,730
Looms, number active	4,493	19,398	38,836	49,379
Cotton consumed, pounds	33,759,000	145,833,000	236,666,000	477,623,000
Cottonseed Oil Mills:				
Capital	.....	.....	$12,720,146	*$31,647,732
Products, value	.....	$8,064,112	$23,640,779	*$99,320,307
Furniture Manufacturing:				
Products, value	.....	$1,273,000	$2,060,000	*$5,109,000
Pig Iron made, tons	24,394	¶¶28,984	***14,725	.....
Coke made, tons	38,041	73,928	43,814	*16,523
Lumber cut, feet	451,788,000	1,308,610,000	1,041,617,000	†809,391,000
Mineral Products, value	$703,078	$3,448,233	$6,048,253	†$11,120,000
Coal mined, tons	154,644	315,557	177,245	.....
Iron Ore mined, tons	†††84,584	¶¶336,186	313,878	117,321
All Land in Farms, acres	.....	26,392,057	26,953,413	*25,441,061
Improved Land, acres	8,204,720	10,615,644	12,298,017	*13.055.209
Number of Farms	.....	224,691	291,027	*310,732
Value all Farm Property	.....	$228,374,637	$580,546,381	*$1,356,685,196
Value Farm Land	.....	$138,515,430	$370,353,415	*$897,444,961
Farm Products, value	$67,029,000	$104,304,000	$257,351,095	$323,000,000
Farm Crops, value	.....	$86,345,000	$216,972,000	$248,400,000
Cotton Crop:				
Bales, number	815,000	1,309,000	1,767,000	590,000
Tobacco Crop, pounds	.....	1,105,600	1,485,994	11,237,000
Grain Crop:				
Corn, bushels	21,939,000	34,119,000	51,982,000	49,215,000
Wheat, bushels	3,056,000	5,011,000	1,480,000	1,739,000
Oats, bushels	6,185,000	7,010,000	7,353,000	9,378,000
Live Stock:				
Cattle, number	860,000	899,000	1,080,000	1,212,000
Sheep, number	527,000	336,000	188,000	63,000
Swine, number	1,471,000	1,424,000	1,784,000	1,542,000
Horses, number	99,000	127,000	120,000	89,000
Mules, number	132,000	207,000	295,000	377,000
National Banks:				
Resources	$7,849,727	$23,563,135	$92,690,047	$176,618,000
Capital	$2,221,000	$4,306,000	$13,314,240	$13,641,000
Deposits	$2,012,457	$10,864,848	$44,941,972	$109,349,000
Other Banks, deposits	$5,910,827	$22,260,235	$43,798,000	$173,250,000
Railroad Mileage	2,459	5.652	7,056	†7,193
Highway Expenditures	.....	**$894,936	††$3,688,172	$18,818.000
Public Schools, expenditures	$471,000	$1,980,000	‡‡$3,742,900	†$13,506,000
Assessed Value Property	$251,963,124	$433,323,691	$765,965,634	$1,190,921,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Includes North Carolina. ***Includes Texas. †††Includes North Carolina and West Virginia.

Outlook for Mineral Development in Kentucky.

By Dr. Willard Rouse Jillson, Director and State Geologist, Kentucky Geological Survey, Frankfort, Ky.

As detailed geological work has progressed in Kentucky during the last decade, it has become more and more apparent that the state's mineral resources are but slightly developed. This is true, though the last ten years have seen more operations started in Kentucky than has any similar time in the state's history.



Willard Rouse Jillson

Statements relative to the natural wealth of Kentucky have, however, become axiomatic to such an extent as to have lost their force, and consequently any such discussion calls forth much less in the way of enthusiasm than it merits.

Newly coined words and phrases are the precursors of fundamental changes, economic and social. Rarely ever are great advances indicated by worn-out similes or descriptions. The greatest obstacle in the development of Kentucky today is not the lack of actual extension of all mineral operations on a grand scale, but rather a lack of serious thinking and a desire to extend these mineral operations. Where there is a will there is a way. If the minds of the people of Kentucky were seriously attuned to the possibilities of mineral development in this state, that development would surely follow in course.

Base Mapping a Necessity

Among the several obstacles to the development of Kentucky, there are a number which are actual and concrete. Some of these, peculiar to wide areas, are found by the mineral operators to be a brake upon development. Foremost in this class is the lack of a complete topographic base map for this state. On July 1, 1923, Kentucky, with an area of 40,598 square miles, had mapped 19,893 square miles, a considerable portion of which was on a small scale, leaving unmapped 20,705 square miles.

Rich Resources Hidden

The vastness of the territory unmapped in Kentucky is best conveyed to the lay mind by saying that after one leaves Grahn Station in central Carter county there are no topographic base maps until Lexington is reached. From Georgetown northward to Covington there is no topographic base map. From Shepherdsville southeastward to Somerset, south to Tompkinsville and west to Hawesville there are no topographic base maps, and from Bowling Green westward to the Mississippi, and from Murray north to Smithland there are no standard maps. This broad territory thus roughly described and constituting the heart of Kentucky is richly underlain with asphalt, fluorspar, clays, coal, oil, gas and other minerals, all of which are unmapped in any accurate manner.

Fortunately for this large unmapped territory, the Kentucky Geological Survey has been able to execute a number of rapidly surveyed reconnaissance maps which enable those who may be interested in this territory to find their way through it, but these maps are not accurate enough to serve as a base for detailed geological, soil, highway or other investigations.

A serious obstruction to the advancement of mineral development in Kentucky is found in the lack of appreciation at home of the work which the Kentucky Geological Survey has done in the past, and may do in the future if properly financed, for the people of the state. It is not an unkind thing to say that this popular attitude is due to a lack of information on the part of the general public, and semi-hostile, depreciatory attitude on the part of former state officers who for decades have closely circumscribed the field activities of the Kentucky Geological Survey by reducing its finances to a mere pittance. The poverty of the State Geological Survey has not infrequently been recognized in the past, and many promises have been made as to its financial reorganization, but this worthy idea has never been accomplished, though thousands of well-informed citizens wish the department well.

Mineral Interests Indifferent

The fact that remains and stands out now most prominently is that the Kentucky Geological Survey does not have the organized support of the mineral interests of this state. It also lacks a full recognition and lively interest on the part of those who control the destinies of the state.

Some one has said that fear is a normal part of life. Every individual, every corporation and every organization has it in one form or another, and the great mineral groups of Kentucky, strong as they may be in numbers, and compact as they may be in organization, are afraid to support the Kentucky Geological Survey because of what they plead might be asked of them in return. It does not help the matter any to say that these great organizations are afraid of hobgoblins. Though this fear is founded on a great fallacy, it is one of the greatest obstacles to the development of the mineral interests in Kentucky.

If the coal organizations, the oil organizations, the fluorspar, asphalt and clay operators and the various quarry men of this state would band together and demand that the mineral resources of the state be base mapped, and that adequate geology be laid down on these maps forthwith it could be easily done, and nothing could be made to stand in its way.

Total Mineral Production

During the three years 1918, 1919 and 1920 crude production of coal, petroleum, and fluorspar in Kentucky was valued at $401,251,701. The total mineral production for these same three years is estimated to have been not less than $450,000,000, probably more. The world demand for certain crude minerals, such as coal, petroleum, rock asphalt and fluorspar, is increasing rapidly year by year, and the production of these minerals in this state can be made to increase in proportion, since they are produced here in superior quality. Lack of initiative holds them to comparatively low volume, however, while economics makes its appeal to home-folks more or less in vain. In the year 1923 Kentucky produced 41,000,000 tons of coal, valued at $112,000,000, and 8,069,000 barrels of oil, valued at $15,169,000. Its possibilities were certainly greatly in excess of mere figures.

The aggravating problem of farm-land taxation which

confronts Kentucky could be most readily and soundly solved by a development of the mineral and natural resources of Kentucky. Circling the bluegrass region of Kentucky there are twenty-five so-called pauper counties. Practically all of these counties are unmapped, although they contain vast mineral reserves of one kind or another. These pauper counties are a great burden upon the self-provident, agricultural and mineral counties of eastern, central and western Kentucky. The only sound way to lighten the tax burden of the central and western Kentucky farmer is to topographically base-map and develop the mineral resources of this great incompleted area and make it self-sustaining. This can be done and by the expenditure of a much more insignificant sum than that which is now being spent to sustain them in poverty from year to year.

Asphalt and Fire-Clay Fields

The great rock asphalt field of Kentucky underlies parts of Grayson, Edmonson, Hart, Breckinridge, Warren and Logan counties. One of the greatest flint fire-clay fields and cannel-coal fields of the United States underlies Carter, Rowan, Morgan, Elliott, Greenup and Lewis counties. Mineral development and the introduction of new plants and industries, with their dependable payrolls, would provide new tax sources both for the counties and the state in all of this vast region.

The Kentucky Geological Survey by statute is the servant of the people of the state. It should also be a coworker with other departmental organizations of the state. Full advantage is not now being taken of the opportunity offered to make practical use of the Kentucky Geological Survey and its publications, nor has it ever been. The pioneer of mineral development, the explorer of mineral wealth, and the adventurer among the unmarked and little known portions of the Commonwealth, the Kentucky Geological Survey has already done much to advance this Commonwealth along material lines.

Great Development Possible

If properly financed and fostered by public opinion, this department can do more in the next few years to advance the interests of the people of Kentucky for the amount of money which may be spent upon it than any other single department of the state government. Kentucky's resources in coal, oil, asphalt, fluorspar, building stones and what not else are vast enough to support an annual crude production value of at least $500,000,000 a year. All of this increased mineral production would necessitate a parallel or sustaining development, consisting of new houses, stores, factories and miscellaneous industry. The day when Kentucky may present her crude mineral values in maximum denominations will continue, however, to be delayed as long as the people hold the present apathetic attitude towards the support of the Kentucky Geological Survey, the one state department which holds the key to the mineral wealth of the Commonwealth.

Synonymous Terms

When you think of the South, think of the Manufacturers Record as its exponent and advocate for the last forty-two years, think of the influence it has had in bringing Southern and Eastern and Western people into closer business touch and creating business opportunities for all to the profit of seller and buyer alike, think what it has endeavored to do in fostering the creation and enlargement of every line of activity, looking to a broader utilization of its resources for the benefit of the South and the country.

Our Advertising Pages Voice the Activity of the South

A newspaper or magazine without a liberal supply of advertising is, as the old saying has it, about as interesting as kissing a pretty girl over the telephone. Neither is very substantial nor effective.

It is, therefore, especially gratifying that The South's Development is not in that category. Its advertising pages, which are many and illuminative, should be of profound interest to every business man of every class and of every section.

These advertisements give expression to the activities of the South whose people have sought this medium through which to invite the attention of the whole country to the things which they are producing or selling, whether it be the work of railroads, of banks, of manufacturers, of towns and cities, of real estate organizations, or of any of the other varied interests which are here represented.

The very impressiveness of the advertisements represented in these pages of concerns outside of the South is a tribute to the virility and activity and increasing buying power of the South on the part of business men in other sections, who in this way seek to interest the South in what they are doing.

The volume of advertising of Southern railroads, banks, towns and cities and other interests is an expression of the enthusiasm which prevails in that section and the desire to impress this fact upon the people of other parts of the country. To a large extent the activity in different parts of the South can be fairly measured by the extent of advertising from different states.

Here has been brought together as at a great marketing place in which can be studied to advantage the widest variety of business interests, where one may search out the things that are of particular value to the individual investigator.

Our advertisers have, we believe, rendered a very distinct service to the entire country. They have made possible the publication of The South's Development, the influence of which upon the advancement of the South and the full utilization of its vast resources will be of national importance.

Out of the influences set in motion by this publication it is safe to say that billions of capital will eventually be turned into Southern investments, and every profitable investment made in the South broadens the Americanism and the business life of the entire country.

It is especially gratifying to the publishers that through this hearty co-operation we have been able to issue a publication greater, we believe, in volume, more influential, we believe, for the good of the country than any other publication ever issued in behalf of the business interests of this or any other section.

To every advertiser, great and small alike, North, South, East and West, we extend our heartiest appreciation for this co-operation. As the influence of this publication goes on from week to week and year to year we trust that our advertisers will be abundantly remunerated in direct results as well as in the indirect but still larger results which will come from aiding in the upbuilding of the South and thus in the upbuilding of the country.

Some Kentucky Resources

THE COAL area of Kentucky is equal to that of all of Europe, excluding Russia. Much of this coal is of the highest quality and easily mined.

From a production of 5,328,000 tons in 1900 the coal output of Kentucky jumped in 1923 to 41,000,000 tons. Other resources of Kentucky in soil and timber and hydro-electric potentialities when fully utilized should make that state one of the richest in the Union.

There is yet much room in Kentucky for the expansion of its educational activities, but the growth which has been made is indicated in public school expenditures from $3,710,000 in 1914 to $14,149,000 in 1922.

KENTUCKY

Total Area, 40,598 Square Miles; Land, 40,181 Square Miles; Water, 417 Square Miles

	1880	1900	1910	1923
Population	1,648,690	2,147,174	2,289,905	2,462,317
Property, true value	$902,000,000	$1,365,131,000	¶$2,277,004,000	†$3,582,391,000
Manufactures:				
Capital	$45,813,039	$87,995,822	$172,778,805	*$276,535,000
Products, value	$75,483,377	$126,508,660	$223,754,497	‡$302,742,000
Mines, Quarries and Wells:				
Capital	.....	.....	$26,786,640	*$201,247,725
Products, value	.....	.....	$12,100,175	*$98,486,910
Cotton Manufacturing:				
Capital	$360,000	$1,868,000	$1,916,000	*$4,108,000
Products, value	$418,000	$1,664,000	$1,902,000	*$4,459,000
Spindles, number active	9,022	66,633	84,078	92,684
Looms, number active	73	991	1,312	1,376
Cotton consumed, pounds	1,882,000	11,972,000	10,846,000	15,526,000
Cottonseed Oil Mills:				
Capital	.....	.....	$2,362,683	.....
Products, value	.....	$4,683,343	$4,141,175	.....
Furniture Manufacturing:				
Products, value	.....	$1,504,000	$1,671,000	*$5,412,000
Pig Iron made, tons	51,525	71,562	100,509	¶¶
Coke made, tons	4,250	95,532	53,857	***435,000
Lumber cut, feet	305,684,000	765,343,000	753,556,000	†210,360,000
Mineral Products, value	$1,583,295	$7,102,364	$21,512,982	†$158,701,000
Coal mined, tons	946,288	5,328,964	14,623,319	41,000,000
Iron Ore mined, tons	57,865	52,920	†††64,347	.....
Petroleum, barrels	.....	‡‡‡62,259	‡‡‡468,774	8,069,000
All Land in Farms, acres	.....	21,979,422	22,189,127	*21,612,772
Improved Land, acres	10,731,683	13,741,968	14,354,471	*13,975,746
Number of Farms	.....	234,667	259,185	*270,626
Value all Farm Property	.....	$471,045,856	$773,797,880	*$1,511,901,077
Value Farm Land	.....	$291,117,430	$484,464,617	*$1,050,752,680
Farm Products, value	$63,850,000	$123,267,000	$218,456,263	$383,700,000
Farm Crops, value	.....	$78,963,000	$130,595,000	$237,600,000
Cotton Crop:			(Less than 2000 bales)	
Tobacco Crop, pounds	.....	314,288,050	398,482,301	494,190,000
Grain Crop:				
Corn, bushels	86,040,000	69,267,000	101,500,000	87,866,000
Wheat, bushels	10,565,000	12,443,000	9,818,000	7,688,000
Oats, bushels	7,026,000	9,309,000	4,375,000	4,725,000
Live Stock:				
Cattle, number	807,000	1,083,000	1,001,000	991,000
Sheep, number	1,000,000	1,297,000	1,363,000	701,000
Swine, number	2,225,000	1,955,000	1,492,000	1,109,000
Horses, number	373,000	452,000	443,000	363,000
Mules, number	116,000	191,000	225,000	278,000
National Banks:				
Resources	$33,333,221	$65,758,544	$113,003,541	$279,107,000
Capital	$10,146,500	$12,842,595	$17,616,360	$18,521,000
Deposits	$8,510,630	$27,755,375	$54,726,391	$179,247,000
Other Banks, deposits	$13,501,787	$34,044,105	$70,001,000	$189,500,000
Railroad Mileage	1,530	3,060	3,526	†3,955
Highway Expenditures	.....	**$1,161,194	††$2,474,621	$15,647,000
Public Schools, expenditures	$1,069,000	$3,037,900	‡‡$3,710,500	†$14,149,000
Assessed Value Property	$370,743,384	$640,688,240	$894,462,458	$2,478,205,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Included with West Virginia. ***By-product coke only. †††Includes West Virginia. ‡‡‡Includes Tennessee.

Some Facts About Louisiana

By Hon. Henry L. Fuqua, Governor of Louisiana

Practical and scientific conservation of the varied resources of Louisiana, which are among the most valuable of any Commonwealth in the confines of the United States, and practical effort looking toward the further extension and completion of the state's already comprehensive highway system will figure among the chief constructive policies of the present state administration. These departments are being reorganized with the sole thought in view of increasing their effectiveness as agencies of the state.

As an index more accurate than any other, probably, the assessed value of property in Louisiana today, as compared with the figures of ten years ago, conclusively shows the increasing prosperity and economic importance of Louisiana among the sisterhood of states. The following figures speak forcefully of the state's economic advancement:

Assessed value of property in 1923	$1,600,657,984
Assessed value of property in 1913	581,063,253

This shows an increase of more than 175 per cent in a decade.

Communication via the highway system of the state has ever been esteemed of the utmost importance, and the present administration has a lively appreciation of not only the necessity of increasing these facilities but the equally important one of maintaining in first-class condition the highways which already have been constructed, and which, without constant attention, would inevitably deteriorate and render useless the original expenditures.

An indication of what Louisiana, working in conjunction with the Federal Government, is doing in the matter of highways alone is shown by the fact that these agencies expended more than $5,000,000 for such purposes last year, and the expenditure for the coming year will closely approximate $10,000,000—a superb showing for a state containing the population of Louisiana.

With added highway facilities, educational advantages have kept pace, as is shown by the expenditures of the state for schools and colleges:

Expenditures for Education

	1913-14	1923-24
Public schools	$5,949,319	$20,334,131
State higher educational institutions	518,260	1,299,312
Totals	$6,467,579	$21,633,443

The following figures give a more itemized statement of expenditures by the state for educational purposes for the present 1923-24 terms:

	1913-14	1923-24
Louisiana State University	$175,110	$459,808
Louisiana State Normal	97,371	212,955
Louisiana Polytechnic Institute	139,639	202,062
Southwestern Louisiana Institute	52,735	187,783
School for Deaf	26,155	75,881
School for Blind	27,250	43,151
Southern University (negro)	.....	117,672
Totals	$518,260	$1,299,312

In the conservation of the state's natural resources Louisiana is unquestionably the foremost state in the Union. The destructive forces in evidence for many years above the Canadian border, where the slaughter of game birds and the wholesale destruction of birds' eggs was prevalent for many years, has been largely offset by the conservation legislation of Louisiana being in conformity with the migratory bird treaty act between the United States and Great Britain. The treaty and Louisiana laws protect game birds during their migration to Southern feeding grounds. Louisiana is the most important of all the game refuges existing on the American continent. Among the agencies actively protecting the game bird life, outside the Department of Conservation, are the refuges provided by the Rockefeller Foundation and the Russell Sage bequests.

The first protection ever afforded an oyster bed in the United States found its inception in Louisiana a half century ago, and the oyster department of the Louisiana Department of Conservation has been the creator of laws governing the conservation of oysters that have been copied by virtually all states where the bivalve still flourishes.

Because of its excellent forestry laws, Louisiana still is ranked among the chief timber-producing sections of the country. It affords not only fire protection, but its timber is so thinned, and not entirely denuded, as to assure timber here for many years to come.

While there are but few large fur-bearing animals in the state, it is still one of the big fur-producing sections of the country because of the prevalence of and protection of the smaller animals of the fur-bearing species, such as muskrats, minks, raccoons, opossums, fox, otters and beavers.

The mineral division of the state is also of national importance, as Louisiana contains the largest salt deposits, the largest sulphur deposits, and ranks extremely high in both oil and gas production. Enormous deposits of sand and gravel line the beds of the streams of the state, and the shell deposits of extinct oyster reefs in the waters of the Gulf amount to 600,000,000 cubic yards. These are being manufactured into cement, lime and other commercial products, and for road-building purposes. The revenues derived from this source alone will yield the state through its severance tax $60,000,000.

In conclusion, it may be said without fear of contradiction that Louisiana ranks foremost in natural resources of the country. Its wealth is unbounded, its future assured through its wise conservation laws, and in the far future it will surely still maintain this advantage.

Agriculturally, the state has a comprehensive wealth that is almost incalculable, from the cotton fields in the northern and middle sections to the sugar cane and tropical fruits in the South. Surely, one of the most favored spots that God has entrusted to man's care—and in Louisiana such care is given unstintedly and without favor or fear.

Facts of the Present Vs. Theories of the Past

Just before the discovery of petroleum in Louisiana some years ago, one of the leading business men of that state said to the editor of the Manufacturers Record:

> "Of course, Louisiana has no minerals and must depend for its development upon its soil and its timber."

And that was the general impression of Louisiana people.

How little the people of that state then knew of what the coming years would develop is shown in the comprehensive article by the state geologist which follows.

Louisiana's Mineral Resources: Past and Present

By Henry V. Howe, State Geologist, Baton Rouge, La.

From 1902 to the end of 1923 Louisiana's mines and wells have returned her more than $622,000,000.

The story of Louisiana's remarkable rise in mineral production properly should start with the establishment of the State Geological Survey under Gilbert D. Harris in 1899. Cramped for lack of funds, and able to devote to this work only a portion of his time, this remarkable man and his able assistant, A. C. Veatch, in the years that followed to 1910 when the survey was abandoned, unearthed and published such a wealth of information on Louisiana's geology that the results, with which this article deals, were but the natural result.

Henry V. Howe

It was not until 1902 that the results of Harris' work became apparent, when the oil, salt and mineral-water industries together rose to an annual production of $279,327. To this may be added the clay-products industry, which amounted that year to $642,000. This was Louisiana's first large mineral production, and while it fell more than a hundred thousand dollars short of the million-mark, it was the beginning of a glorious page in the state's history.

The discovery of oil in Louisiana in 1902 was followed in 1904 by the perfection of the Fraasch process for the extraction of sulphur, and from that time on Louisiana's mineral production rose year by year, until in 1920 the annual production passed $140,000,000. Since 1920 there has been a marked decline, due to the lower price obtainable for petroleum.

The story of the development and future of each of the principal mineral industries of Louisiana follows:

Salt

Salt was the first mineral to be commercially developed in Louisiana. Even in the days before the advent of the white man the Indians carried on a trade in it. During colonial days this trade was kept up by the white settlers, but it was local only. However, when the Federal blockade cut the South off from the rest of the world, the salines of north Louisiana became of great importance and were made to yield many thousands of tons annually. This was accomplished by sinking shallow wells and evaporating the brine from them. However, with the end of the Civil War and the advent of better transportation, these wells gradually ceased to be worked. There were many theories concerning the origin of these salines, but it was not until near the beginning of the present century that their true significance came to be appreciated.

With the discovery that these salt springs overlay great plugs of salt one or two miles in diameter and many thousands of feet in thickness, and that in many cases these great salt masses were near enough to the surface to be actually mined, came a great rejuvenation of the salt industry in Louisiana, and even today, with what are said to be the three greatest salt mines in America, Louisiana is scarcely scratching the surface of her wealth of salt.

The production in 1903 came from the two great mines on Week's and Avery's Islands, and amounted to 568,936 barrels, valued at $178,000. These islands, so called, are in reality great salt plugs pushed up in the form of islands through the marshes of the Louisiana coast. This production has steadily increased until in 1920 it reached 265,085 tons, valued at $1,517,414. And in the twenty years from 1903 to 1923 these two mines, with the more recent addition of a third mine on Jefferson's Island, have produced more than $16,186,000 worth of salt.

In order to gain a proper conception of the vastness of Louisiana's salt resources it is merely necessary to observe that, while Louisiana has been the fifth state in the Union in the production of salt for more than twenty years, she has to date produced little more than 5,000,000 tons of salt. Contrast that with the single deposit of Avery's Island, where more than two billion tons are readily available—salt that is practically pure sodium chloride—so pure that it requires no refining. Multiply this figure by the twenty-five known salt domes in Louisiana—there will doubtless be many more discovered in the future—and it is apparent that Louisiana has produced only 5,000,000 of her 50,000,000,000 tons of salt. Or, in other words, that Louisiana still has available ten thousand times as much salt as she has produced.

Sulphur

The discussion of the Louisiana salt domes does not stop properly with the salt itself, for several of these domes, by the nature of their formation, have served as places of concentration of vast quantities of oil, and in at least one case of sulphur.

The story of Louisiana's rise to the dominating position in the sulphur industry of the world is the story of the invention of the Fraasch method of mining it. Sulphur had been known to exist at a point three miles west of Sulphur, La., since the drilling of a well there, the log of which was published by Hilgard in 1869. At this remarkable locality, between the depths of 400 and 600 feet, no less than eight beds of pure crystalline sulphur were found aggregating 26 feet in thickness. Between these beds sulphur and gypsum occur mixed. It was not possible at that time to mine it because of the overlying beds of quicksand, and it remained unused until 1904, when it was discovered that by drilling wells into which several strings of pipe were lowered super-heated steam could be pumped down, and that the sulphur would flow out between the pipes and be refined at the same time. This invention, one of the most epoch-making in American mining practice, almost immediately made Louisiana the dominating figure in the sulphur business of the world, and in a short time caused a crisis in Italy, where more than thirty thousand people had been engaged in the production of sulphur from the island of Sicily.

Naturally complete figures are not available regarding the production of sulphur from this deposit. Production figures have been the more complicated by the more recent discovery of two more sulphur domes in Texas and the consequent increase in America's sulphur production. Enough is known, however, to make a very fair and conservative

estimate of the production since the invention of the Fraasch process to date. The production of sulphur in Louisiana in 1904, the first year in which the mines were operated, was 127,292 tons, valued at $2,663,760. This production has steadily increased since to 1915, when 327,634 tons were sold for $7,500,000. In the eight years since 1915 the production of sulphur in America has very greatly increased, and it is a legitimate assumption that the value of Louisiana's product has averaged since that time much more than the 1915 figure. However, using that as the average for the past eight years, it is safe to say that this single deposit, owned by the Union Sulphur Company, has produced in excess of $119,000,000 worth of sulphur during the past twenty years.

As to the future of sulphur in Louisiana, it should be noted that the production of sulphur to date has been governed by the market and not by the ability of this deposit to produce. So far there has been no noticeable evidence of this deposit giving out. Moreover, it should be noted that this is the only one of the twenty-five salt domes in Louisiana which has been extensively prospected for sulphur, and it may be that several of the other domes contain deposits similarly extensive.

Petroleum

The petroleum industry in Louisiana is at present developed in two separate and distinct districts: the Gulf Coastal salt dome fields, where the oil has accumulated in late Tertiary and Quaternary sands surrounding the plugs of salt, and the large anticlinal fields of north Louisiana, where the oil occurs in sands of Cretaceous age. The Gulf Coastal fields were the first to be discovered, and from 1902 until 1910, when the large production at Caddo started, south Louisiana was the dominant oil-producing section of the state. The story of the development of the Gulf Coastal fields necessarily starts with the bringing in of the epoch-making Lucas gusher at Spindletop, Texas, with its initial production of 75,000 barrels of oil per day. This remarkable well immediately resulted in the recognition that the salt domes of Texas and Louisiana were suitable structures for oil accumulation, and many of these domes were drilled in the next few years.

The Louisiana production started in 1902 following the discovery of oil in the Jennings field in August, 1901. By 1906 this field reached an annual production of 9,025,174 barrels. Since that time production has been continuous, but has declined steadily. This field, the greatest of the south Louisiana fields, has produced to the end of 1923 45,831,000 barrels of oil. This was followed in 1903 by the discovery of the Welsh salt dome field. Welsh, however, was not a large producer, and from then to the end of 1920, when production ceased, it had produced only 450,000 barrels. Two years later another salt dome, Anse la Butte, started producing. Like Welsh, Anse la Butte has never been a big producer; and while it is still producing, its production has been sporadic and to the end of 1923 has amounted to 664,000 barrels.

Anse la Butte was followed in 1906 by the discovery of the Caddo field in north Louisiana. This, much the greatest of Louisiana's oil fields, is in reality a group of closely related and interlocking fields, covering a vast area to the northwest of Shreveport. The large Caddo production did not begin for several years, but since 1910 this field has produced year by year more oil than all the south Louisiana fields, and is still a large producer. The 1923 production amounted to 4,015,819 barrels, and to the end of that year Caddo had produced 95,640,000 barrels of oil—more than any two other Louisiana fields. Similarly, as noted under the discussion of natural gas, the Caddo area was for several years the world's greatest gas field and today the Monroe field holds that position.

The next large oil field to be discovered in Louisiana was the Vinton salt dome—again a south Louisiana field. Production started in 1910 and has remained remarkably constant from that time to the present, the total production at the end of 1923 amounting to 20,899,000 barrels.

The year 1914 was marked by the discovery of oil in both the De Soto—Red River (including Bull Bayou and Crichton) areas of north Louisiana and the Edgerly dome of south Louisiana. The De Soto, Red River fields, like Caddo, covered a large area in two parishes and were really a group of fields. Production there has held up well to the present time, and at the end of 1923 the Red River fields had produced 28,772,000 barrels and the De Soto fields 13,598,000 barrels. Edgerly reached its peak of production the year following its discovery, but still maintains a steady production. While not a large field like Jennings or Vinton, the production to the end of 1923 has amounted to 5,851,000 barrels.

Since the discovery of Edgerly practically all the oil excitement in Louisiana has been confined to the northern portion of the state. The Homer field was discovered in 1919, and in the following year produced 21,509,000 barrels of oil—the greatest amount of oil any Louisiana field has produced in a single year. The field was drilled up very rapidly, however, and the production naturally declined after the flush days were over. In the five years ending 1923 Homer produced 45,971,000 barrels of oil, making it slightly greater than Jennings and the second largest producer of oil yet discovered in Louisiana.

Following Homer, the Haynesville field was discovered in 1921 and was the scene of nearly as rapid development. Haynesville has, in the three years ending 1923, produced more than 30,464,000 barrels of oil and is the fourth largest field so far discovered in the state.

The year following Haynesville the Bellevue dome was brought into production. The Bellevue field, unlike the others, is a shallow field and has in the past two years produced 2,073,000 barrels of heavy oil.

To gain an adequate conception of what this rapid development of oil production has meant to Louisiana, one observes that the production in 1902 of 548,000 barrels of oil, valued at $188,895, has grown so that in 1920 35,714,000 barrels, valued at $112,803,000, were produced. From the discovery of oil in Louisiana to the end of 1923 the state has produced 291,042,000 barrels of oil, worth $390,000,000.

At present five new fields are undergoing development. The most promising of these is the large Cotton Valley structure in Webster parish, where a number of very large gas wells and several gushers making more than 10,000 barrels initial production have been brought in this year. Smaller production is at present being obtained from the Lloyd Harris structure in northern Webster parish and from the Oakland structure in Union parish. Showings of oil, and one very large gas flow, have been encountered recently at Urania in La Salle parish, but no production has been obtained as yet.

In south Louisiana, at Lake Charles, the Vacuum Oil Company has within the past month brought in what promises to be a large well on a totally new structure. Certainly Louisiana has as much to expect from petroleum in the future as she has enjoyed in the past.

Natural Gas

Natural gas is the natural associate of petroleum, and the development of most oil fields is attended by the development of large quantities of natural gas. The Louisiana oil fields have not been an exception to this rule, and in addition Louisiana has developed several very

large gas structures that apparently do not contain commercial quantities of oil. The most important of these are the Monroe gas field, at present the largest known gas field in the world; the new and very large Webster parish gas fields, and the Terrebonne gas field in south Louisiana.

In the early days of the petroleum development in Louisiana natural gas was considered a nuisance and vast quantities were turned loose in the open air or ignited in great flares which frequently lighted up the country for miles around. As time went on drillers found it profitable to use the natural gas for fuel for the boilers of drilling rigs, and gradually pipe lines were built from the gas fields to Shreveport and other north Louisiana cities, and the gas found a market. However, even today this market is so limited in the face of the tremendous production of the Monroe gas field that the average price is the lowest of any large gas-producing section of the United States—so low, in fact, that most of it is burned for carbon black.

The first commercial production of natural gas in Louisiana was in 1905, and amounted to $1500. This production increased to more than two and a half million dollars in 1912, and the great Caddo oil field was at that time the greatest gas field in the world. Since 1912 the production of natural gas has increased rapidly, and for the year 1923 amounted to 110,783,723,000 cubic feet, valued at more than $9,900,000. What the total quantity of gas produced in Louisiana since the discovery of oil has been can scarcely be estimated, since such a great portion of it was utterly wasted in the early days of its development. The value of the gas actually utilized, however, since 1905 has to the end of 1923 amounted to more than $53,000,000.

In addition to the great gas fields already mentioned, Louisiana contains a number of smaller fields and several areas that give promise of large future production.

Carbon Black

The carbon-black industry in Louisiana is a development of the last few years only and is the result of the great volume of gas available from the Monroe field and consequent overtaking of the facilities for consumption. There has been a good deal of agitation against the carbon-black industry in Louisiana. In spite of this opposition, however, it has developed at an amazing rate, and at present there are more than forty plants operating in the Monroe gas field using during the year 1923 at least 86,000,000,000 cubic feet of gas. The production of carbon black in Louisiana during the past five years easily exceeds $12,000,000 and bids fair to greatly increase in the near future unless curtailed by legislation, with the idea of reserving the natural gas for city consumption and for manufacturing purposes.

Natural-Gas Gasoline

The natural-gas gasoline industry in Louisiana is a development of the last nine years. This is due to two things: The discovery that natural gas frequently carried large quantities of the lighter hydrocarbons which could be extracted without damage to the gas, and the fact that only in recent years has there been an adequate appreciation of the value of Louisiana's natural-gas resources.

Even in 1916 the natural-gas gasoline production reached but 2,113,159 gallons, valued at $269,564. However, with the development of the Monroe gas field and the subsequent construction of absorption plants, the production of natural-gas gasoline increased rapidly, until in 1921 the production was 15,340,474 gallons, valued at $1,812,268. This production has been very materially increased since that time, and in the nine years ending 1923 more than $11,250,000 worth of natural-gas gasoline has been saved.

Naturally, the future of this industry is dependent upon the future of the natural-gas production, which has already been considered.

Sand and Gravel

The consumption of sand and gravel in Louisiana has been one of steady development for the past twenty years. Louisiana produces building sand, grinding sand, fire or furnace sand, engine sand, paving sand, building gravel, paving gravel and railroad ballast.

Down to 1914 the production varied from year to year, averaging about 750,000 tons, valued at from $250,000 to $448,000 per year. Since 1914 the production and value of sand and gravel has steadily increased. This has been augmented since the World War by the construction of an elaborate system of state highways requiring great quantities of gravel. The production of sand and gravel in 1921 amounted to 1,821,695 tons, valued at $1,491,406. The production for the past twenty years has been in excess of 25,000,000 tons and has amounted to slightly over $10,000,000.

The sand and gravel industry is dependent in large measure upon construction work. The growth of Louisiana's cities and the recent construction of a magnificent system of state highways annually requiring great quantities of gravel for maintenance should in itself guarantee the future of this industry.

Clay Industries

While Louisiana was not naturally supplied with large resources of building stone, she was supplied with numerous clay and shale formations suitable for the manufacture of brick and tile. She was at the same time endowed with abundant natural gas capable for some time at least of supplying cheap fuel for the burning of these clays. In spite of this, the production of brick and tile, which averaged from 1900 to 1907 more than $750,000 per year, steadily declined until the end of the World War. Since that time the rapid construction work which has been going on in Louisiana's cities has stimulated the industry, until in 1920 the 19 plants operating in Louisiana produced $955,608 worth of brick and tile. While complete figures since that date are not available, the industry apparently is still growing steadily. The total production of brick and tile has amounted during the past twenty-four years to $10,170,000.

The consumption of finer clays in Louisiana still awaits a scientific study of their possibilities. But one pottery plant has maintained steady production in Louisiana, and while complete figures are not available, the figures for the years that are available show the production to be in excess of $7000 per year, or a total of more than $126,000 for the past eighteen years.

Of all the state's mineral resources, probably the greatest potentially is the clay industry. The lumber industry, which has been one of Louisiana's mainstays in the past, will apparently be considerably curtailed within the next ten or fifteen years. Construction, which in the past has been largely of wood, will have to be replaced more and more with concrete and brick. With some of the most extensive clay deposits anywhere in America, with the cheapest natural-gas fuel in America for burning the clay, to date little attention has been paid to the scientific investigation of the properties of these different clays, their proper blending to produce different types of building brick, fire brick, paving brick, tile, pottery and fine clay products. This, in the writer's opinion, is the least

studied and one of the most promising of Louisiana's great mineral industries.

Mineral Water

This is an industry which in the last few years has had little activity in Louisiana. However, in the sixteen years from 1901 to 1916 more than $700,000 worth of mineral water was produced from five springs. Since 1916 the production has been very much smaller.

Undeveloped Mineral Resources

Louisiana's undeveloped mineral resources include large deposits of soft coal, or lignite; numerous deposits of limonite, or low-grade iron ore; several deposits of wad, or manganese, ore; at least two large deposits of very fine-grained volcanic ash suitable for scouring powders, and at least two deposits of limestone and one of marl, which may in the future be used in the manufacture of cement.

Louisiana's Banking Development.

In 1900 the total bank deposits of Louisiana amounted to $36,200,000. By 1910 the figures had advanced to $102,400,000, whereas in 1923 the deposits in the banks of that state aggregated $372,600,000, an increase which voices the remarkable progress the financial interests of that state are making. It is based on sound values, for in 1900, or 23 years ago, the value of all property in Louisiana was $815,158,000 compared with over $3,416,000,000 in 1922.

LOUISIANA

Total Area, 48,506 Square Miles; Land 45,409 Square Miles; Water, 3,097 Square Miles

	1880	1900	1910	1923
Population	939,946	1,381,625	1,656,388	1,849,746
Property, true value	$382,000,000	$815,158,000	¶$1,989,813,000	†$3,416,860,000
Manufactures:				
Capital	$11,462,468	$100,874,729	$221,816,398	*$462,209,000
Products, value	$24,205,183	$111,397,919	$223,948,638	‡$479,100,000
Mines, Quarries and Wells:				
Capital	.....	.....	$13,207,232	*$97,612,906
Products, value	.....	.....	$6,547,050	*$40,005,835
Cotton Manufacturing:				
Spindles, number active	6,096	55,600	88,136	94,748
Looms, number active	120	1,584	1,832	2,229
Cotton consumed, pounds	644,000	7,282,000	5,171,000	23,575,000
Cottonseed Oil Mills:				
Capital	.....	.....	$7,163,820	*$13,997,927
Products, value	$3,739,466	$7,026,452	$13,084,586	*$57,161,578
Lumber cut, feet	133,472,000	1,113,423,000	3,733,900,000	†3,386,000,000
Mineral Products, value	$48,000	$789,219	$10,119,993	†$75,519,000
Petroleum, barrels	.....	.....	6,841,395	24,919,000
All Land in Farms, acres	.....	11,059,127	10,439,481	*10,019,822
Improved Land, acres	2,739,972	4,666,532	5,276,016	*5,626,226
Number of Farms	.....	115,969	120,546	*135,463
Value all Farm Property	.....	$198,536,906	$301,220,988	*$589,826,679
Value Farm Land	.....	$107,730,210	$187,803,277	*$383,618,162
Farm Products, value	$42,883,000	$72,667,000	$90,401,857	$194,700,000
Farm Crops, value	.....	$62,654,000	$73,536,000	$169,400,000
Cotton Crop:				
Bales, number	509,000	625,000	246,000	365,000
Tobacco Crop, pounds	.....	102,000	172,418	465,000
Grain Crop:				
Corn, bushels	14,913,000	24,703,000	42,055,000	24,702,000
Oats, bushels	405,000	614,000	774,000	1,232,000
Live Stock:				
Cattle, number	428,000	670,000	805,000	793,000
Sheep, number	136,000	220,000	178,000	116,000
Swine, number	633,000	788,000	1,328,000	665,000
Horse, number	104,000	194,000	181,000	168,000
Mules, number	77,000	144,000	132,000	180,000
National Banks:				
Resources	$13,255,603	$33,526,484	$69,191,784	$133,706,000
Capital	$3,475,000	$3,285,000	$8,086,500	$9,050,000
Deposits	$6,013,172	$20,308,027	$31,374,574	$83,698,000
Other Banks, deposits	$4,719,465	$15,968,225	$71,105,000	$288,966,000
Railroad Mileage	652	2,824	5,554	†5,065
Highway Expenditures	.....	**$345,452	††$1,777,572	$15,142,000
Public Schools, expenditures	$411,800	$1,135,100	‡‡$3,572,600	†$16,453,000
Assessed Value Property	$160,162,439	$276,659,407	$527,773,950	$1,600,658,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

Maryland—Her Recent Progress

By Hon. Albert C. Ritchie, Governor of Maryland

My purpose is to refer only to a few of the respects in which Maryland's progress during recent years has been marked. Anything like a comprehensive survey would be out of the question within the limits of this article.

State Government and Taxation

No state government has advanced more rapidly in recent years than that of Maryland. The state's departmental machinery has been reorganized and co-ordinated; its hospitals and institutions rank with the best in the country; its highways are unexcelled anywhere; its educational system has shown an extraordinary development.

Albert C. Ritchie

All this has been done with a material decrease in the state tax rate. In 1920 the rate was 36 31-72 cents per $100. Since then it has been lowered each year, until in 1925 the rate is 27 12-25 cents. This represents a decrease of practically 25 per cent in five years. There has been no decrease anywhere approaching this during any period of years since the Civil War.

Industrial Progress

The industrial progress of Maryland during the last decade has been phenomenal.

In 1914 the total capital invested was $294,000,000, of which $178,000,000 was in Baltimore city. In the succeeding five years the invested capital reached $620,000,000, of which $435,000,000 was in Baltimore city. During the same period invested capital in Hagerstown increased from $7,000,000 to $14,000,000; in Cumberland, from $8,000,000 to $11,000,000; in Frederick, from $3,000,000 to $5,000,000. Since that time there has been a further very substantial increase in invested capital throughout the state, with its bulk, of course, in Baltimore.

The peak of industrial output was in 1919 and 1920, when manufacturing values for the whole state reached $874,000,000, of which $678,000,000 represented the product of Baltimore city factories.

In 1914 the total payroll of manufacturing plants in the state was $54,000,000. In 1923 it was $138,000,000, of which Baltimore city factories paid $119,000,000.

In 1914 the outlay for materials used in the fabrication of over 2000 commodities was $239,000,000. This reached a peak in 1919 and 1920 of $550,000,000. In 1923 the total was $528,000,000, of which Baltimore city factories contributed $419,000,000.

Baltimore city now ranks seventh among the industrial centers of the United States.

The state's leading industries, ranked according to the value of their output under normal conditions, are: Shipbuilding, men's clothing, slaughtering and meat packing, fertilizers, canning and preserving, bread and other bakery products, iron and steel, steel works and rolling mills, flour-mill and grist-mill products, cotton goods, foundry and machine-shop products, women's clothing, stamped and enameled ware, shirts, printing and publishing, paper and wood pulp, printing and publishing newspapers and periodicals, food preparations, lumber and planing-mill products.

The state bank deposits in 1924 were $432,240,000, as compared with $310,351,000 for 1919 and $191,538,000 for 1914. They have more than doubled in the last decade.

The total state banking resources (capital, surplus and deposits) were $508,200,000 in 1924, as compared with $365,983,000 in 1919 and $234,804,000 in 1914. These also have more than doubled in the last decade.

Agriculture

The unfavorable agricultural conditions which followed the war have been less acute in Maryland than in most other parts of the United States. This is largely due to the fact that the farmers practice diversified cropping and to a variation on crops and rotations, which avoids extensive competition between different parts of the state. This condition is favored by the great variety of soils, the differences in climate and the large markets which can be reached with a relatively low transportation cost.

The result is that Maryland is one of the most favored states in the Union for the production of food. This in turn has caused the rapid growth of areas devoted to the production of market milk, market garden (vegetable) crops and fruits of all kinds. The demand for these has developed an extensive canning industry.

The per acre value of all Maryland crops in 1923 was $34.93, as compared with $31.82 for 1922 and $24.44 for 1921. The money value in 1923 was $67,560,000, of which the corn crop represented $20,689,000, the wheat crop $10,426,000 and the hay crop $9,912,000.

The 1923 corn crop harvest averaged 39.3 bushels per acre, exceeding that of five-sixths of all other states.

The canning crop of 1923 was valued at $5,072,000, which was approximately 15 per cent of the total crop of the United States. In canned pineapples, Maryland ranks first among the states. In beans, corn, peas, spinach, sweet potatoes, tomatoes, pears, peaches and strawberries Maryland ranks second.

Highways

In 1908 Maryland started upon a comprehensive program of highway development. The initial bond issue was $5,000,000 to build a system of roads connecting Baltimore city with each of the twenty-three county-seats. This bond issue has been supplemented by others until Maryland has now invested $35,000,000 from bond issues and $9,000,000 from other sources on a system of roads aggregating 2400 miles, which reaches every county-seat and every town of as many as 1000 inhabitants.

The funds for the maintenance and reconstruction of this system of roads have always come from the motor vehicle. Until 1922 this entire fund came from motor-vehicle registration fees. That year a gasoline tax was substituted for part of the registration fee. The entire fund for maintenance and reconstruction is now about $3,500,000 annually, and there is spent each year about $3,000,000 in new construction.

Maryland has a greater percentage of improved roads than any other state. Nothing has contributed more to the development of her resources.

Forestry

Maryland's forests are one of her most valuable assets. She was the first state in the South to enact progressive

forestry legislation. The forest lands cover 2,228,000 acres, or about one-third of the total land area of the state. Conditions for timber growing are unexcelled. A fire-protection system has been established for the detection and reporting of forest fires, and an organized force of forest wardens has been equipped for their extinguishment. A state forest nursery is providing trees for forest planting at low cost, and the Forest Department co-operates with the woodland owners in the practical working out of their problems.

The total lumber and timber value is $4,845,000. The value of the standing saw timber is $20,000,000. Wood-using industries in the state consume annually 345,000,000 board feet, costing at the factories $8,000,000 and employing 10,000 wage-earners.

Oysters, Crabs, Fish and Game

The Chesapeake Bay and its tributaries cover about 2300 square miles of navigable waters within Maryland. From the state's earliest history these waters have produced seafood in great abundance and have made a livelihood for thousands of our citizens. During the past 60 years Maryland waters have yielded about 450,000,000 bushels of oysters, selling for more than $200,000,000.

The demand for oysters has caused overfishing and a considerable decrease in the annual supply. In 1921 shell-planting operations were started, and the state has been planting about 200,000 bushels each year. One planting of 80,000 bushels of shells has resulted in growing three bushels of oysters for every bushel of shells planted.

Chesapeake Bay is also noted as the habitat of the blue crab. The crab is migratory throughout the Bay. The crab mates in Maryland in July and August. Then the female crab seeks the warmer Virginia waters near the Capes, where the eggs develop. After spending the winter months in the vicinity of Hampton Roads, the egg sponge appears between June and August, and the young crabs hatch out. Allowing for the greatest mortality, one female crab may be expected to produce 1000 young crabs. Overcatching and lack of sufficient protection for the female crab has caused the annual supply to diminish materially, and the Fishery Departments of both Maryland and Virginia are now co-operating in the formulation of regulations to replenish the supply.

All hunters, with a few exceptions, are licensed, and the state's Game Department is run upon the income thus produced, ranging from $100,000 to $112,000 a year.

There is a State Game Farm on which Chinese and Mongolian pheasants are propagated and distributed annually throughout the covers in the state for propagation purposes.

Public Education

In 1920 the state appropriated for the maintenance support of its schools, outside of Baltimore city, $2,039,000. For 1925 it has appropriated $3,694,000; for 1926, $3,812,000; for 1927, $3,896,000, representing an increase of nearly 100 per cent.

The result is that Maryland's rating, according to Ayre's Index Number of educational efficiency, has risen from 43.2 in 1918 to 72.8 in 1923.

In 1920 the average salary of teachers in the white high schools outside of Baltimore city was $1017; in 1923 it was $1436. The average salary of teachers in white elementary schools in 1920 was $631; in 1923 it was $990. The average salary of teachers in colored elementary schools in 1920 was $359; in 1923 it was $513.

In the state normal schools the enrollment increased from 144 in 1920 to 694 in 1924. In 1924 the Baltimore city pupils are being taught at the state normal schools, and the enrollment is 1100. In the fall of 1924 over 300 normal-school graduates entered the county schools, compared with 51 in 1920.

The chief concern of the state is to place a trained teacher in every school. In 1920 only one-third of the white elementary school teachers, outside of Baltimore city, held first-grade certificates. In October, 1924, 55 out of every 100 teachers held such certificates. Nearly one-half of the untrained teachers in 1920 have been replaced by trained teachers in 1924.

In 1920 there were 86 high schools outside of Baltimore city; in 1924 there were 155. In 1920 the enrollment at these schools was 9000 pupils; in 1924 it was doubled. State aid to high schools has been increased 50 per cent.

A State Equalization Fund has been established to aid the financially poorer counties. Any county which cannot carry the state program for better trained teachers and at the same time provide adequately for school maintenance on a 67-cent county school tax rate is entitled to share in this fund.

Public Health

Under the medical leadership in which Baltimore city is so rich, public health work has progressed to a degree scarcely equaled in any other state. It has closely followed the latest discoveries in preventive medicine. In Maryland were born the national movements for the prevention of tuberculosis and infant mortality.

In 1916 the general death rate was 16.52 per 1000 of population. In 1920 it declined to 14.65, and in 1922 to 13.62. This in a population which is 16.7 per cent colored.

Only one-half as many cases of typhoid fever occurred in 1923 as in 1916. Since 1920 the death rate from diphtheria declined 19.84 per cent and from tuberculosis 17.64 per cent.

Clinics for the early diagnosis of tuberculosis have been established throughout the state, and fifteen veneral-disease clinics give more than 30,000 treatments annually to several thousand patients. Biologics for the prevention and cure of smallpox, typhoid fever, diphtheria and rabies are made accessible to every physician and health officer in the state. Public-health nursing has been rapidly extended. The Bureau of Sanitary Engineering exercises supervision over the purity of the waters of the state, examines all sewage and water-supply projects and passes on the adequacy of sewage-disposal systems.

These are some of the more important developments in Maryland resources and activities. They are by no means all. But they are indicative of like development in other fields. They forecast a future very full with promise.

Growth of Baltimore

Few cities in the country are developing more rapidly industrially than Baltimore. The advantages of this city have been carefully investigated by many of the most important concerns in the country, based on data compiled by the Industrial Bureau, and have found that Baltimore offers exceptional advantages for the establishment of big manufacturing plants. This is bringing out a growth in new enterprises and in the expansion of existing plants almost as phenomenal as the development of Detroit through the creation of the automobile industry. This industrial advance is not confined to any one line but, on the contrary, covers almost every variety of industries to be found in any part of the country.

Maryland

By Dr. Edward B. Mathews, State Geologist, Baltimore

Maryland at times has been the leading state in the production of copper, iron, coal and other mineral products. As a pioneer in these industries it contributed much to our national economic life, but its future development will be as a residential, mercantile or professional state rather than an exploiter of raw materials. This is due to the fact that its industries and occupations are more thoroughly adjusted to the environment than those of any other of the Southern states. There is consequently less likelihood of change in industries or of the development of new natural resources. This maturity of adjustment is due to many factors, among which may be cited the natural environment of the early settlements on the waterways of the Chesapeake and its estuaries, along which the growing population was easily dispersed without the construction of highways, and the fact that the breach through the barrier to westward expansion offered by the Blue Ridge lies nearer the seaports in Maryland than elsewhere, permitting the ready occupation of the entire state and an early recognition of its natural resources. As a result of this adjustment Maryland possesses fewer of the characteristics of a pioneer state and more of the attributes of a well-balanced residential community.

Edward B. Mathews

The future of Maryland lies in the development of trade and manufacturing rather than the exploitation of its natural resources, and as a gateway for the hinterland of the inland states to the world at large. For this purpose Baltimore, with its harbor developed by excellent terminal facilities at the end of the continental lines passing through the Appalachians by the gorges of the Potomac, is very favorably situated. Its position at the head of tidewater, where cargoes must be broken and transferred from seagoing to land vehicles; where trade flows easily north and south along the fall-line and east and west between the sea and the interior of the continent, forecasts a continuous, stable growth and the maintenance of eminence among the cities of the nation, a position which it has held since colonial days.

The stability of the communities developed in Maryland may be seen in a consideration of the distribution of the adherents of the various religious bodies. The present proportions of the various groups can be easily associated with the historical development of the state. Settled originally by a Roman Catholic Proprietor, where first in America complete religious toleration was offered to all religious believers, the different colonial settlements early became characterized by local groups holding characteristic religious beliefs which have persisted to the present. In southern Maryland, where the first settlements were made, there is an outstanding predominance of adherents to Roman Catholicism in accordance with the belief of the early settlers. On the Eastern Shore, which, soon after its early settlement, was moved by the great revival under Whitfield, the dominating affiliation is with Methodism; in the limestone valleys of central Maryland, along which early migrants moved from the German settlements of Pennsylvania, is a local development of Dunkards and Mennonites; while in the western portion of the state, with its mineral wealth, are numerous adherents to Roman Catholicism and Presbyterianism, which characterized the belief of the early Scotch-Irish miners of the region. Baltimore city, as a focus of the state, is a composite of all of these groups, to which may be added a number of congregations of Jewish faith.

Maryland is a tiny section, at one point less than two miles wide, across the Atlantic slope of the continent. Within its confines are portions of the three dominant physiographic provinces—the Atlantic Coastal Plain, the Piedmont Plateau and the Appalachian Mountains. Most of the waters flow into the Atlantic Ocean via the Chesapeake Bay, which divides the state into two unequal parts, one-third lying east of the Chesapeake. The continental divide passes across the northwestern corner of the state, which contains a small area of the headwaters of the Mississippi basin. The social and commercial connections are with the Atlantic Coast, and center in Baltimore and Washington.

The economic resources and conditions are markedly different in the three physiographic provinces. The life of the Coastal Plain is predominantly agricultural, with local developments of the oyster and fishing industries. Near the urban centers there is a development of the clays suitable for brick, tile and terra cotta. The Piedmont Plateau is mercantile and manufacturing. The mineral wealth consists chiefly of building stone and cement rock. The agricultural activities center on the supplying of urban demands. The Appalachian district is engaged chiefly in orcharding, forestry and the exploitation of the coal fields of the five coal basins of the state, which are outliers of the more extensive coal deposits of West Virginia and Pennsylvania. Only 1.1 per cent of the population is engaged in mining industries, and 16 per cent in agriculture and forestry, while 34 per cent is engaged in manufacturing and mechanical industries, and an equal number in mercantile, transportation, professional and clerical occupations. A study of the population figures for the last half-century shows that most of the state has been static, or growing slowly along with the rest of the country, except in the vicinity of Baltimore, Washington and, to a less degree, Cumberland and Hagerstown.

In the history of the state are many incidents which have since become of national or international importance. The first wheat was shipped to Europe from Baltimore in 1771; the first regular steam packet that crossed the Atlantic direct from the United States sailed from Baltimore in May, 1838; the Morse telegraph line transmitted its first message ("What hath God wrought?") from Baltimore to Washington, April 9, 1844; Baltimore was the first city to have a water company (1792), street gaslights (1816), a railroad (1828), an iron building (1851), an electric street railroad (1885), an electric locomotive (1895). The city contains the first official state monument to George Washington (1815), the oldest American lodge of the Independent Order of Odd Fellows (1819) and the oldest College of Dental Surgery (1839).

Maryland has always been a religious center. As early as 1631 services were regularly conducted on Kent Island by an ordained minister of the Church of England. The

first Presbyterian church in America was established at Snow Hill about 1700, and in 1766 Robert Strawbridge established the first Methodist congregation in America in Carroll, then Frederick county. Many of the most prominent of the early settlers were Roman Catholics, and the see of Baltimore has held the first position in America since the decree of 1858.

The educational history of the state dates back to 1696, when Governor Francis Nicholson established the first public school at Annapolis, now St. John's College. Baltimore is the educational center of the state. In it are located the Johns Hopkins University, the professional schools of the University of Maryland, Goucher College, Loyola College, the Peabody Institute, the Maryland Institute, and many other similar educational institutions.

Statements regarding Maryland, when expressed in statistical form, give a false impression unless it is constantly borne in mind that its land area is scarcely one-third of the next smallest of the Southern states (West Virginia) or one-twenty-ninth of the largest (Texas) of the states of the South. Although its gross population is next to the lowest, it has between four and five times as many inhabitants per square mile and a larger percentage of males engaged in gainful occupations than any other Southern state. Although Baltimore and its suburbs include over half of its population, Maryland has the largest yield per capita of wheat, and the largest number per square mile of dairy cattle and chickens. With the exception of Texas, it has the largest number of telephones per hundred inhabitants.

Natural Resources

The leading natural resources of Maryland may be grouped under three heads: The mineral resources, including coals, building stones, etc.; the forests and agriculture, and the water products taken from the sea, bays and rivers of the state. To these may be added the water-power resources, which are largely undeveloped.

Mineral Resources—The mineral resources of Maryland are of much value and have yielded a great variety of products, which in most instances were of more importance in the earlier stages of the development of the country than at present. The Eastern Shore and southern Maryland are practically devoid of other mineral resources than clays, infusorial earth and occasionally deposits of marl. The old crystalline rocks in the Piedmont Plateau district of central Maryland yield building stones, slates, decorative marbles, cement rock, as well as smaller amounts of gold, copper, chrome, lead, zinc, flint and feldspar and kaolin. The most important mineral product of western Maryland is the coal from the five coal basins, the most famous of which is the Cumberland and Georges Creek basin, which includes the wonderful "Big Vein" coal, which has a well-established reputation of pre-eminence as a steam and smithing coal. In the same area are important bodies of fire clay. The value of the aggregate annual mineral production of the state has increased from $6,000,000 in 1896, when the State Geological Survey began gathering statistics, to over $31,000,000 in 1920.

Forests and Agriculture—Maryland has been settled so long that the land has in general been assigned to its most profitable uses. The high, rocky lands of the mountainous section, fit only for forestry or grazing, are to a large extent under forest cover, with here and there clearings for extensive orchards. In southern Maryland, where soil erosion is extreme on the ravine slopes when cleared, these areas have been abandoned for agricultural purposes and are now largely wooded. The wooded areas of the Eastern Shore are largely confined to swampy districts, which are too wet for satisfactory cultivation but are able to support satisfactory forest growths. The fertile, well drained, rolling country of central Maryland is under a high state of cultivation, the forests being confined chiefly to rocky ridges or steep hillsides, with the rough land along the streams. In general the conditions in Maryland may be summarized as follows: 35 per cent wooded, 51 per cent improved farm lands, 11 per cent waste lands and 3 per cent salt marsh lands.

The woodland lots and forested areas of the state have all been surveyed and their stands estimated, the results appearing on the forestry maps published by the Geological Survey on the scale of a mile to the inch, or on the generalized maps of the State Board of Forestry on the scale of three miles to the inch. The State Board of Forestry also conducts a very efficient fire patrol, protecting the woodlands. The total annual cut is under $10,000,000, and it is not likely that there will be any appreciable increase in this amount.

The farm lands, consisting of 51 per cent of the acreage of the state, are usually in a high state of cultivation, due to the exceptional advantages to the agriculturalist offered by the great variety of soils, the climatic conditions, and the fine market and transportation facilities. Agriculturally, the state may be divided into four divisions, corresponding to the physiographic provinces, the Coastal Plain being subdivided into two parts by the Chesapeake Bay. Each of these subdivisions is a distinct agricultural region, possessing certain peculiarities of soils, surface features, climatic conditions and of market.

The Eastern Shore, lying between the ocean on the east and the Bay on the west, has an evenly tempered climate, level, easily tilled lands, especially adaptable to early fruit and vegetables as well as the staple crops of wheat, corn and hay. The conditions of underdrainage, on account of poor subsoils, are better in the northern part, since the clayey subsoils of the southern counties tend to develop local swampy areas which are more profitably used as woodlands. The excellent transportation facilities and the benign climatic conditions have developed lucrative truck, fruit and cannery industries which have in large measure supplanted the ordinary staple farm crops.

In southern Maryland, that portion of the Coastal Plain to the west of Chesapeake Bay, is a more diversified, rougher surface, with greater variety of soils and agricultural conditions. On the uplands tobacco and wheat have been grown advantageously for nearly three hundred years. Much of the area has not reached its maximum development because of poor transportation facilities and the sparsely settled condition of some of the counties. This area affords many opportunities for development under appropriate conditions of transportation, labor and agricultural practices.

Northern Maryland, which corresponds to the Piedmont Plateau, is of residual soils, which, with few exceptions, are strong and fertile and highly satisfactory, when carefully cultivated, for crops of grain, wheat, corn and other cereals. A large acreage of this area is devoted to the production of canning crops.

In western Maryland the agricultural conditions are sharply contrasted on the east and west on either side of North Mountain. To the eastward lies the fertile, broad Hagerstown Valley, with its excellent farms and highly cultivated fields, along whose eastern margin lies the mountainous sides of the Blue Ridge, covered with peach orchards. To the westward the district is rough and mountainous and, as a rule, thickly wooded and unadapted to farming purposes except in the upland phases of Garrett county, where the climatic conditions are, as a rule, not as favorable for farming as in the eastern part of the state.

The greater portion of arable land of the state is now under cultivation and farmed at a fair profit, but there are extensive areas and numerous opportunities for success in more intensive farming and for specialization, particularly in the development of supplies of dairy products, poultry and vegetables for nearby cities.

Water Products.—Chesapeake Bay and its tributaries, occupying less than one-quarter of the entire area of Maryland, have become renowned throughout the country for their oysters, crabs, terrapin and shad. The oysters, beside supplying the local demand, supply important packing and canning industries in Baltimore, Crisfield and many other points. The hard-shell crabs supply crab-canning centers at several points on the Bay shore and yield great quantities of crab meat annually. The soft-shell crabs yield a delicacy for the local tables, but unfortunately cannot be shipped alive without difficulty.

The famous terrapin of the Chesapeake are now mostly "farmed" from the time of their capture in the summer until the development of the demand in the winter, when they may bring as much as $75 a dozen.

The principal shad region lies in the lower reaches of the Susquehanna and the estuaries about the head of the Bay, as well as in the waters of the Potomac and other broad estuarine rivers. Many other varieties of edible fish are secured from the Chesapeake Bay, among them being the highly prized Bay or Spanish mackerel, the blue fish, and bay trout.

The abundance of these nearby table delicacies aids materially in the development of Maryland as a residential state, attracting to it men of means and culture as well as thousands of laboring men.

MARYLAND

Total Area, 12,327 Square Miles; Land, 9,941 Square Miles; Water, 2,386 Square Miles

	1880	1900	1910	1923
Population	934,943	1,188,044	1,295,346	1,505,295
Property, true value	$837,000,000	$1,317,373,000	¶$2,235,483,000	†$3,990,730,000
Manufactures:				
Capital	$58,742,384	$149,155,313	$251,226,828	*$619,607,000
Products, value	$106,780,563	$211,076,143	$315,669,150	‡$637,574,000
Mines and Quarries:				
Capital	.....	.....	$25,169,678	*$21,078,980
Products, value	.....	.....	$5,782,045	*$9,698,577
Cotton Manufacturing:				
Capital	$4,601,000	$7,709,000	$9,024,000	*$16,441,000
Products, value	$4,682,000	$5,423,000	$5,522,000	*$18,454,000
Spindles, number active	125,706	154,064	143,000	112,024
Looms, number active	2,425	2,810	3,000	1,900
Cotton consumed, pounds	24,166,000	39,902,000	30,048,000	22,000,000
Furniture Manufacturing:				
Products, value	.....	$3,976,000	$3,352,000	*$6,828,000
Pig Iron made, tons	54,854	290,073	326,214	529,606
Coke made, tons	.....	.....	.....	864,000
Lumber cut, feet	123,336,000	183,393,000	154,554,000	†54,358,000
Mineral Products, value	$3,731,000	$11,942,000	$15,440,207	†$14,905,000
Coal mined, tons	2,228,917	4,024,688	5,217,125	2,700,000
Iron Ore mined, tons	124,000	26,223	14,062	¶¶59,684
All Land in Farms, acres	.....	5,170,075	5,057,140	*4,757,999
Improved Land, acres	3,342,700	3,516,352	3,354,767	*3,136,728
Number of Farms	.....	46,012	48,923	*47,908
Value all Farm Property	.....	$204,645,407	$286,167,028	*$463,638,120
Value Farm Land	.....	$120,367,550	$163,451,614	*$259,904,047
Farm Products, value	$28,839,000	$43,823,000	$64,171,069	$113,000,000
Farm Crops, value	.....	$30,217,000	$40,331,000	$71,000,000
Tobacco Crop, pounds	.....	24,589,480	17,845,699	19,008,000
Grain Crop:				
Corn, bushels	21,702,000	15,233,000	22,110,000	25,231,000
Wheat, bushels	8,486,000	15,188,000	10,510,000	10,426,000
Oats, bushels	2,278,000	1,783,000	1,410,000	1,758,000
Live Stock:				
Cattle, number	240,000	293,000	288,000	299,000
Sheep, number	171,000	191,000	237,000	96,000
Swine, number	335,000	318,000	302,000	299,000
Horses, number	118,000	149,000	155,000	135,000
Mules, number	13,000	18,000	23,000	33,000
National Banks:				
Resources	$50,858,354	$96,669,395	$158,439,722	$272,274,000
Capital	$13,222,030	$15,122,660	$18,582,160	$16,729,000
Deposits	$21,431,763	$42,941,480	$77,790,163	$175,866,000
Other Banks, deposits	$26,634,263	$69,395,411	$152,260,000	$389,592,000
Railroad Mileage	1,040	1,376	1,426	†1,448
Highways Expenditures	.....	**$873,471	††$6,000,652	$8,873,000
Public Schools, expenditures	$1,544,400	$2,803,000	‡‡$3,452,700	†$14,720,000
Assessed Value Property	$497,307,675	$616,719,782	$836,665,067	$2,065,961,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Includes North Carolina.

Mississippi

Her Resources and Industrial, Agricultural and Educational Development

By Hon. Dennis Murphree, Lieutenant Governor of Mississippi

There is so much that might be very well said about Mississippi, her progress, opportunities and development, that, with the limited space at my disposal, I hardly know where to begin or where to leave off.

The resources of Mississippi are many and varied. Our state is divided into several great sections, each having its own peculiar fitness for the growth of some plant, or some natural resource which is now in the process or has been developed.

Dennis Murphree

The great fertile delta of Mississippi, comprising an empire within itself, is, so far as fertility of the soil is concerned, one of the richest sections in the world. Long-staple cotton is the chief product, and more cotton is produced within this area than in any other section of like size in the world.

In central and southwestern Mississippi lies the wonderful trucking section, and from these fields go every year thousands of carloads of the finest vegetables that can be grown to supply the markets of the big cities of the North and of Canada.

In south Mississippi is the magnificent lumbering region, where the finest pine timber of the world is being manufactured in huge mills and shipped to all parts of the civilized world.

On the Mississippi Sound and contiguous to the Gulf of Mexico is what is known as the "Coast of Mississippi," a region which is rapidly gaining a reputation and a fame as a winter resort and which, because of the mildness of its climate, the purity of its waters and the beauty of its scenery, is each year attracting a rapidly increasing swarm of tourists and winter visitors, who have given it the name of "The Riviera of America."

In northeast Mississippi we have what is known as the "prairies," a section which geologists tell us was a long time ago the bed of a great lake or inland body of water. Its soil is black and wonderfully fertile.

In the central and northern portions we have the "hills" of Mississippi, a vast territory of rolling country, covered with splendid forests of hardwood and other timbers, and watered by innumerable springs and small creeks and rivers. The lands are wonderfully productive, especially in the valleys, and this is known as the great granary section of our state.

Over 88 per cent of the population of Mississippi is rural and no state can show greater activity in promoting the welfare of its rural citizens. Naturally, agriculture is our main and our chief industry. Practically every kind of agricultural plant can be successfully and profitable grown in Mississippi. Our chief crops are cotton, corn, hay, oats, wheat, sweet and Irish potatoes, alfalfa, lespedeza, peas, beans, peanuts, sugar cane, sorghum, as well as all kinds of vegetables and winter cover crops. We also grow a number of grasses.

Dairying is a big industry in our state. It is rapidly growing in popularity because of the fact that our winters are short and mild and our long growing seasons give the farmers wonderful opportunities to produce splendid milk at a very reasonable cost. Creameries and milk stations are springing up all over the state, and in a few years we expect to be one of the leading dairy states in the Union.

Our state has 31 per cent developed land and 69 per cent undeveloped.

Our population in 1920 was 1,790,618, and will show a goodly increase in 1930.

We have no drainage problems of note. Our state is traversed by numerous creeks and small rivers of clear water. There is only a small amount of stagnant water. We have practically no low or inundated lands, and to this fact, plus the splendid work of our State Health Department, we attribute our wonderful health record. Harrison county, Mississippi, is the healthiest county in the United States, according to the United States Health Department. Our death rate is only 8.7 white population per thousand.

We have a number of springs and wells nationally known for their health-giving, medicinal properties. Purest artesian water is abundant in the state, and many of our cities and farms are supplied with it.

Mississippi averages 260 growing days for each year, and as great a variety of products can be grown in merchantable quantities here as anywhere else in the Union. We can grow as much corn per acre as Kansas, as much hay as Oklahoma, oats as North Dakota, silage as Colorado, wheat as Minnesota, potatoes as Indiana, strawberries as Oregon, peaches and grapes as Vermont, and more sweet potatoes and sugar cane than anywhere else.

Not only this, but, besides offering unsurpassed opportunities for agricultural, horticultural, dairying and poultry, we have mineral resources.

The Mining Congress Journal for September, 1924, says: "Mississippi, known as an agricultural state, with vast resources of limestone, building stone, sand and gravel, tripolite and fuller's earth, bauxite, lignite, mica and phosphate rock, has already awakened to the call of the mineral prospector, and a network of good roads is spreading through the state simultaneously with a school system of exceptional merit."

And further: "The development of hydro-electric power from the great rivers of the north and east of the Mississippi will make possible electric smelters and aluminum reduction works in the iron-ore and bauxite deposits of north Mississippi, and will make her a great mineral-producing state. A wide diversity of clays, deposits of ocher, barytes and potential oil areas similar to Louisiana will add to her mineral wealth."

From 1910 to 1920 Mississippi made the following increases in values: Farm buildings, 84 per cent; farm implements, 139.5 per cent; livestock, 79.4 per cent; value of all crops, 139.2 per cent. In 1919 we made a greater increase in dairying than any other state.

In 1920 Mississippi made a greater increase in poultry than any other state in the Union, and in 1924 we will also surpass all others.

From 1910 to 1920 our state led the entire Mississippi Valley in corn production increase, having made 34 per cent gain. And in the same period we led all the states with a 96 per cent increase in hay production.

We have the largest cotton plantation in the world and the largest pecan orchard.

From 1910 to 1920 we had a larger increase in hogs than did Iowa, larger increase in cattle than Nebraska, poultry than South Dakota, honey than California, dried fruit than Washington and butterfat than Wisconsin. Sheep decreased in all states during this period. Ours was less than Idaho and other sheep-raising states.

In the matter of improvement of highways no state has shown greater progress than has Mississippi. A few years ago there were practically no improved highways in the state. Today we have under maintenance by the State Highway Department—a department created in 1916 and which is now doing a wonderful work—1700 miles of improved hard-surfaced highways. These 1700 miles of road were practically all constructed in co-operation with the Federal Government and with counties using bond issues and automobile fees to finance the projects. In addition, the various counties have constructed independently of the Highway Department about 2000 miles of hard-surfaced roads, making in all a total of 3700 miles of improved highways in Mississippi. The State Highway Department has expended $15,000,000 in building good roads in the state and has now under construction $6,000,000 more. By January 1 they will have awarded contracts for 100 miles more Federal-aid roads. The money to maintain these roads is derived from a 3c-a-gallon gas tax, one-half of which remains in the local county treasury and the other goes to the credit of the Highway Department. At the last session of the Mississippi Legislature a bill was passed designating a system of state highways to touch each county-seat and main town in the state. This system totals 5400 miles and will be rapidly built.

In the matter of public education, the United States Commissioner of Education is responsible for the statement recently made that the people of Mississippi have made more progress educationally during the last few years than any other state in the Union. A few years ago Mississippi's school system was rated by the Russell-Sage Foundation as being forty-seventh in the list of states. Now, with one thousand consolidated schools, forty-nine agricultural high schools and two hundred and fifty teacher's homes, we lead all the other states in these three lines. A few years ago we had no fully accredited four-year high schools. Today we have two hundred and forty-seven. Then we had one A1 college; today we have six. Mississippi has thirty-two high schools on the all-Southern list. We have a smaller per cent of adult illiteracy amongst our white population than any other Southern state, except Florida and Texas. Mississippi has sixteen colleges for the education of white boys and girls and seventeen for negroes. Our educational system ranks with the best in the South and in a few years will be as good as any in the nation.

To my mind the one thing that shows most conclusively what Mississippi has been doing in the way of material progress is the showing of the banks of Mississippi. In 1900 we had in our state a total of all bank resources only $19,345,840. Today we have 320 state banks alone that have a total of all resources $166,627,105.49. We have 37 national banks whose resources have increased in like proportion with the state banks. In 1914 our state banking laws were changed as to give us a supervision of banks by a State Banking Department. In January, 1924, a new law went into effect which materially changed the provisions of the old law so as to make one man superintendent of banks in the state, and this man—Hon. J. S. Love—has been able to materially improve the banking situation since he took over the reins of office. In 1914 we had 312 state banks whose total resources were $52,500,000. As stated above, we now have in state banks a total of $166,627,105.49. The increase in bank deposits in the last ten years has been $96,000,000 and the increase in total resources for ten years has been 300 per cent.

As a state, Mississippi is extremely kind to her unfortunates. We have 26 hospitals supported in whole or in part by the state for the care of charity patients. We have a million-dollar tuberculosis sanitarium, owned and operated by the state; we have a colony, or home, for the feeble-minded; a $600,000 institution for the training and reformation of the wayward youth of the state, as well as splendid institutions for the training of the blind and deaf. Our hospitals for the insane are doing wonderful work, not as institutions where crazy folks are confined, but as places where diseased minds are treated and oftentimes entirely cured. So, too, the state has an excellent system of schools and colleges, supported by the state.

A big power company is even now engaged in building high-power lines over a large section of the state, and with the development of Muscle Shoals, just outside the northeast corner of Mississippi, and the bringing of the cheap power in from the gas fields to the west of us, we feel that Mississippi is entering upon an era of industrial and manufacturing development that will be marvelous.

The price of land is ridiculously low here. Choice land in the delta, already highly improved, may be had as low as $100 per acre. In other sections land wonderously fertile can be purchased as low as $25 per acre for improved and down to $5 and $10 for raw land.

Summing up, Mississippi a few years ago, with only her climate and timber resources to boast of, can now show a great state, with splendid educational facilities, an excellent system of roads, a splendidly developed and diversified agricultural section, and, withal, a people independent, happy, healthy and prosperous.

With soil, rainfall, sunshine, variety of products, health, good schools, good roads, finest hunting and fishing, a wonderful coast line and with more good, highly productive, yet cheap, lands than any other state, Mississippi confidently presents to those who seek new fields for health and wealth opportunities unsurpassed.

Mississippi's Awakening.

THERE ARE many signs that the people of Mississippi are awakening to the unusually interesting potentialities of their state. Its educational progress as shown by Lieutenant Governor Murphree will doubtless prove a revelation to many people. Indeed, his whole story is such an inspiring one that the state and the people individually should have it reprinted in a little leaflet and have that enclosed in every letter that goes out of the state.

Mississippi's interest in education was shown years ago when it established a splendid industrial college for women, at that time the finest, and by some claimed to be the first, of its kind in the United States. This institute gave an academic training, but required that every student should take a course in some line of self-supporting work, such as bookkeeping, stenography, dressmaking or other work. In order to popularize it in its early days with the poorer class of girls, many families of wealth and social position sent their daughters to that institution for the incentive which would thus be given to girls less fortunately situated. This is one of the great educational insitutions of the state which has had a marked effect for good upon the lives of the people of Mississippi.

Mineral Resources of Mississippi

By E. N. Lowe, Director Mississippi Geological Survey, University, Miss.

Mississippi lies wholly within the Gulf Coastal Plain. Hence the geological formations exposed within the state are not older than the Cretaceous. Only in the northeast corner have the larger streams cut down through the Cretaceous strata so as to expose the hard sandstones and limestones of the Mississippian rocks of the Paleozoic system. These are seen over a few square miles in Tishomingo and Itawamba counties. The lowest beds are Devonian, forming bluffs bordering the Tennessee River. Toward the top the limestones become shaly and cherty.

None of the formations in the geologic column between the Mississippian and the Upper Cretaceous outcrop in Mississippi; hence the Cretaceous beds overlie the Mississippian unconformably. The basal beds of the Cretaceous here are sands and shales, with some lignite, in the Tuscaloosa formation. Overlying these is a glauconitic marine sand of the Eutaw formation, passing by rather sharp but conformable transition to the soft aluminous limestone of the Selma Chalk. The topmost Cretaceous beds are limestones, and highly fossiliferous, bluish, marly sands of the Ripley formation.

The formations overlie unconformably the Cretaceous beds, having a thickness of several thousand feet, ranging from the Eocene to the Pliocene. They consist for the most part of semi-consolidated clays, sands, marls and limestones, partly laid down in fresh water and in estuaries, and partly of marine origin. Lignite beds of considerable thickness occur in several of these formations; clays of potential value in others; scattered but important deposits of spathic and brown iron oxide ores and bauxite in some of the lower horizons. Mineral waters are common in the middle and upper horizons of the Tertiary formations.

The Pleistocene and Recent deposits comprise extensive alluvial deposits of the flood-plain of the Mississippi and other streams of the state and a blanket of loess silt that overlies all earlier formations in the western uplands, reaching a thickness of fifty to seventy-five feet at the Mississippi River bluffs.

Mineral Resources

Iron—While Mississippi has no iron deposits comparable with those of Alabama, important scattered beds of iron ore of commercial grade occur in two forms—spathic, or carbonate ore, and brown oxide ore. In most instances the brown ore is a product of oxidation of the carbonate through weathering. These ores are all of Eocene age, though some excellent brown ore occurs in the lowest beds of the Cretaceous. Two different horizons furnish the chief deposits—the Wilcox beds near the base of the Tertiary, and the Claiborne beds near the middle of the Eocene series. The most extensive deposits of spathic ores occur in the basal beds of the Wilcox in Marshall, Benton, Lafayette, Calhoun and Webster counties, in thin beds or lens-shaped concretions, interstratified with gray or lignitic clays. A freshly broken surface is light gray in color, but on exposure to the atmosphere it gradually turns brown or red, owing to oxidation. Analyses of numerous samples from different deposits give an approximate average of 50 per cent metallic iron for the brown ores and 55 to 60 per cent for the carbonate ores after roasting. They are remarkably free from sulphur and phosphorus.

A small charcoal furnace was established at Winborn, Benton county, in 1912, by Birmingham investors, and for a time considerable pig iron was made. The ore belt is only a few miles wide, north and south, and only one railroad touches it. In the development of these deposits no underground mining will be necessary, the ores being available by stripping. Limestone for fluxing outcrops on the railroad within 20 miles of the ore, and fuel would be accessible from Birmingham.

Aluminum—The commercial ore of this metal, bauxite, is comparatively rare. Until the winter of 1921-22 bauxite was not known to exist in Mississippi, but since then investigation has revealed deposits of commercial quantity and quality in several of the northern counties. The beds occur in the base of the Wilcox division of the Eocene Tertiary, where the ore is usually associated with gray clays of the Wilcox, immediately above the Wilcox-Midway contact, and usually forms a semi-indurated capping of the Pontotoc Ridge region in Tippah, Union, Pontotoc and other counties to the southeast, extending into Alabama through southern Noxubee. The beds vary in thickness from one foot to sixteen feet, and cover considerable areas. The bauxite varies in color from deep iron brown to pale buff. Some of the darker ores are firm and heavy from the iron oxide cement, but from this extreme type, which usually lies upon the surface, the iron content diminishes to a small percentage in those of light color. Four types of ore are found in Pontotoc county—the pisolitic, oolitic, vesicular, and amorphous. In places it has been locally called "peanut rock," because of its resemblance to peanut candy. P. F. Morse, in Mississippi Geological Survey Bulletin No. 19, on the "Bauxite Deposits of Mississippi," reports fully on these deposits. Numerous analyses accompany the report, and Morse summarizes as follows: "The deposits which have been prospected are estimated to contain 403,000 tons of bauxite of 40 per cent to 60 per cent Al_2O_3, and 145,000 tons of bauxite, of 50 per cent to 60 per cent Al_2O_3. All the ore can be dried, thus increasing the relative quantity of aluminum oxide about 10 per cent and some of the ore can be washed, thus improving its quality materially. The deposits which have been prospected are estimated to contain more than 1,000,000 tons of low-grade material," besides the higher grade ores mentioned above. The richest of these deposits, in Tippah and Pontotoc counties, have been carefully prospected, and are now owned by the Mississippi Bauxite Company.

Clays—Fully half the counties in the state have commercial deposits of clay suitable for ordinary red brick and drain-tile. Most of the western uplands are covered with a mantle of silty brown clay, from 5 to 15 feet thick, suitable for red brick. It is easily accessible, since it occurs at numerous railroad points throughout the western half of the state. Sand for tempering lies immediately beneath the brown clay.

In the lowlands of the Mississippi delta are large deposits of bluish plastic clay, thousands of acres in extent, and several feet deep; that burns a fine red brick and drain tile. A plant at Clarksdale, in Coahoma county, uses this material exclusively, with an admixture of non-plastic material from the same pit. Approximately one hundred brick and tile plants are operating in Mississippi, distributed quite generally over the state.

Ball, pottery, stoneware and other white-burning clays

abound in extensive deposits in several parts of Mississippi. The greater part of these are distributed over the uplands of the northern half of the state. Handsome white and cream-colored clays of Tuscaloosa (Cretaceous) age are widely distributed in Tishomingo and Itawamba counties, near the Tennessee River, underlying much of these two counties in beds from 8 to 15 feet thick, with an overburden of chert-gravel from 2 to 25 feet in thickness. The clays are highly refractory, and in one or two pits, where the clay is snowy white, the plasticity is reduced by considerable quantities of pure white tripolite, which, however, can easily be washed out, making in itself a useful by-product.

Similar beds of white ball-clays, of Eocene age, are found in Marshall, Lafayette, Benton, Yalobusha, Grenada, Panola, Webster, Kemper and Lauderdale counties. The beds usually lie beneath a few feet of soil overburden and range from 3 to 15 feet in thickness. The clay is highly plastic and burns white to buff color. Pits recently opened near the Illinois Central Railroad in Marshall county show a deposit of white clay 40 feet deep, which makes a firm, handsome buff-colored brick of excellent quality. On glazing it makes a superior ornamental tile. In Tallahatchie county, near Enid and Charleston, pits of high-grade clay have been opened within a few years and considerable quantities shipped to Northern buyers. It is exceptionally free from impurities, is highly plastic and very refractory. Test borings have revealed thicknesses ranging from 15 to 50 feet, uniform in quality and color.

Cement Rock—Bordering the Tennessee River in Tishomingo county are extensive deposits of shaly limestone, proved to be useful for the manufacture of natural cement. Besides this Devonian limestone, a few feet beneath the soil on the prairies of northeast Mississippi, there lies a soft aluminous Cretaceous limestone, in color from pale blue to buff. Analyses have shown that the rock at several points is sufficiently high in calcium carbonate, with the addition of a proportion of the overlying soil, to make a mixture suitable for the manufacture of Portland cement. Much of this rock lies along railroad lines in such thick beds that the supply may be considered inexhaustible. Another limestone belt extending from Vicksburg to Waynesboro, while not so extensive, is suitable for cement manufacture, and where the rock lies accessible to the railroad the product becomes a commercial possibility. In view of the fact that Mississippi has no cement plant, these limestone formations, which lie in extensive deposits at the surface, and are reached by several railroads, would seem to offer an attractive opportunity for development of a cement industry.

Gravel—Mississippi is rich in deposits of gravel suitable for road material and for concrete. These consist of water-worn chert of sizes convenient for road construction. One belt is in the northeastern part of the state in the vicinity of the Tennessee River and the headwaters of the Tombigbee, extending as far as Columbus; another in the western part of the state, follows the bluffs of the Mississippi and spreads eastward across the southern counties.

Besides the chert-gravels extensive deposits of bedded chert are found in strata of Paleozoic age, in the bluffs of the Tennessee River, in beds 30 to 50 feet thick, which will be a resource of great value.

Fuels—Mississippi has no true coal, but lignite, intermediate in fuel value between coal and wood, is found in twenty counties of the state. These deposits are not all of sufficient thickness and extent to justify exploitation, but in several counties it occurs in beds 5 to 6 feet thick, and at some points has been mined for local use. The lignites of Mississippi occur for the most part in the Wilcox of the Eocene Tertiary, the thickest beds so far explored being in Holmes, Choctaw and Lafayette counties. This can be made an important source of power by conversion into producer gas, yielding at the same time large quantities of ammonia.

Mineral Pigments—At a number of points in Tishomingo county Cretaceous clays are so deeply impregnated with iron oxide that they make an excellent paint. These deep-red ocherous clays have been known for a number of years, but little development has been undertaken. The deposits lie on the surface and test-pits have shown a remarkable uniformity of color and quality. In Lauderdale county, a few miles southeast of Meridian, are large deposits of deep-red sands of Eocene age, which, on washing, yield a pure bright red ocher, as much as 25 per cent of a given volume of sand proving to be ocher easily removable by washing.

Yellow ocherous clays of varying shades have been found in the Cretaceous of northeast Mississippi. Considerable quantities of the ocher have been shipped out of the state. A bright-yellow clay occurs near Marion, Lauderdale county, in beds 4 to 5 feet thick, and a considerable deposit of rich yellow ocher is reported from near Oakland, Yalobusha county.

The purest grades of iron carbonate ore, which occur abundantly in several counties, on roasting, make pigments ranging in color from rich red to deep warm browns. Ground lignite mixed in varying proportions with white clays gives several shades of gray, but none of these has yet received development.

Tripolite—Near the Tennessee River the base of the Mississippian beds exposes a deposit of white pulverulent silica, or tripolite. This is interstratified with the chert of that horizon, and appears to be derived from it by a process of disintegration. At a point of 3 miles southeast of old Eastport a mine was formerly opened to exploit it. The tunnels may still be seen, looking like openings into a snowbank, the walls, roof and floor are so white. It is of such firmness that the roofs of the tunnels have never caved, though the mine was not timbered. The tripolite is more than 98 per cent pure silica, and would be suitable for glass manufacture as well as for abrasives. It should also be useful for scouring soaps, fireproofing for safes, steampipes and boilers. The deposit is 12 to 20 feet thick, and underlies a considerable territory in the vicinity of the Tennessee River.

Fuller's Earth—Preliminary tests of several deposits of fuller's earth in Mississippi have given favorable results. A gray friable Oligocene clay from Smith county has given good results, and large deposits of this earth in Yalobusha county give promise of development. The extensive deposits of so-called "claystone," of Eocene Claiborne age, which outcrop in the hills of Clarke, Lauderdale and Newton counties, is a fuller's earth of good quality, as proved by laboratory tests. Lying along railroad lines it is easily accessible.

Oil and Gas—The horizons that produce oil and gas in the Coastal Plain fields west of the Mississippi are also present in this state. The territory has by no means been adequately tested, and it is quite possible that Mississippi may yet become an oil and gas producing territory.

With a better understanding of the extent and value of these resources, such as the State Geological Survey is undertaking to give to the investing public, Mississippi should enter upon an epoch of enlarged growth and development. The outlook is promising for the larger utilization of these valuable mineral interests.

MISSISSIPPI

Total Area, 46,865 Square Miles; Land, 46,362 Square Miles; Water, 503 Square Miles

	1880	1900	1910	1923
Population	1,131,597	1,551,270	1,797,114	*1,790,618
Property, true value	$354,000,000	$557,582,000	¶$1,234,571,000	†$2,177,690,000
Manufactures:				
Capital	$4,727,600	$22,712,186	$72,393,485	*$154,117,000
Products, value	$7,518,302	$33,718,517	$80,555,410	‡$114,084,000
Cotton Manufacturing:				
Capital	$1,122,000	$2,210,000	$5,336,000	*$6,680,000
Products, value	$679,000	$1,473,000	$3,102,000	*$8,067,000
Spindles, number active	18,568	75,122	145,468	178,508
Looms, number active	644	2,464	4,208	4,693
Cotton consumed, pounds	2,882,000	10,364,000	13,827,000	27,566,000
Cottonseed Oil Mills:				
Capital	.....	.....	$10,132,964	*$12,317,330
Products, value	$560,363	$6,681,121	$15,965,543	*$39,202,188
Lumber cut, feet	168,747,000	1,202,334,000	2,122,205,000	†2,267,695,000
Mineral Products, value	$40,000	$621,985	$840,152	†$1,600,000
All Land in Farms, acres	.....	18,240,736	18,557,533	*18,196,979
Improved Land, acres	5,216,937	7,594,428	9,008,310	*9,325,677
Number of Farms	.....	220,803	274,382	*272,101
Value all Farm Property	.....	$204,221,027	$426,314,634	*$964,751,855
Value Farm Land	.....	$114,856,660	$254,002,289	*$641,842,394
Farm Products, value	$63,701,000	$102,492,000	$172,702,838	$259,900,000
Farm Crops, value	.....	$84,884,000	$140,532,000	$203,600,000
Cotton Crop:				
Bales, number	932,000	1,230,000	1,263,000	615,000
Tobacco Crop, pounds	.....	62,760	18,600	*725,577
Grain Crop:				
Corn, bushels	23,218,000	25,232,000	53,095,000	33,742,000
Wheat, bushels	281,000	41,000	70,000	60,000
Oats, bushels	3,021,000	2,390,000	2,304,000	2,280,000
Live Stock:				
Cattle, number	655,000	873,000	1,013,000	1,172,000
Sheep, number	288,000	313,000	195,000	135,000
Swine, number	1,152,000	1,290,000	1,292,000	1,063,000
Horses, number	112,000	229,000	216,000	211,000
Mules, number	129,000	214,000	256,000	308,000
National Banks:				
Resources	.....	$6,557,164	$23,768,395	$66,291,000
Capital	.....	$980,000	$3,415,000	$4,735,000
Deposits	.....	$3,878,626	$12,768,304	$45,604,000
Other Banks, deposits	$2,634,915	$12,547,103	$32,025,000	$147,865,000
Railroad Mileage	1,127	2,920	4,506	†4,235
Highway Expenditures	.....	**$339,669	††$3,960,377	$14,147,000
Public Schools, expenditures	$830,700	$1,385,100	‡‡$1,716,600	†$9,390,000
Assessed Value Property	$110,628,129	$215,765,947	$393,605,644	$702,338,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

Southern Owned Industries

A New England man, after visiting the South, where his company had recently invested many millions of dollars in manufacturing enterprises, said:

"There is still an impression in some quarters of the North that the great development of the Southern textile industry has been brought about by Northern men and Northern capital. Such is not the fact, for fully 80 per cent to 85 per cent of this vast industry was developed by Southern men and with Southern capital. A short time ago my company purchased over $30,000,000 of Southern cotton mills, and other interests have acquired some substantial holdings; but a very large proportion of our Southern mills are still Southern owned and managed by Southern men who are holding their own against any and all competitors.

"I know from thirty years' residence in New England and from frequent visits since coming South that there is still some prejudice among some people against the South. I know from thirty years' experience in the South that there is still some prejudice among some people against the North. But it seems to me the time has come when we should all come to a mutual understanding that there is something bigger and better than being either a Northerner or Southerner, and that is in the fact that we are all citizens of this great American Commonwealth, and whether from the East or West, North or South we should feel perfect freedom in locating in any part of this great country of ours and to feel entirely at home as in our father's house."

Missouri—A Century of Romance in Progress

By Hon. Arthur M. Hyde, Governor of Missouri

Missouri is "The Heart of America." There are five states east of her, five states west of her, two great states north of her and two great states south of her.

Of all the 24 states which were admitted into the American Union after Missouri came in in 1821, only one (Texas) has passed Missouri in population—and it must be remembered that Texas has almost four times the area of Missouri.

Missouri, according to the United States Census, is the "center of value of all farm property," the "center of improved agricultural acreage" and the "center of the production of all cereals"—the center of the United States, both geographically and agriculturally, not south, not north, east or west, but the happy medium enjoying the advantages of each without the drawbacks of either.

Missouri and its cities "blend the culture of the East, the vision of the West, the energy of the North and the hospitality of the South."

When on August 10, 1821, President Monroe signed the proclamation which admitted Missouri into the Union, a sovereign state was created out of a territory which had been, within the preceding twenty-one years, owned by two foreign Powers and which was still a wilderness. The state had then a population of 66,000 souls, ten thousand of them in St. Louis, then as now the metropolis of the state; ten thousand of them in the lead-belt mining regions, and the remainder scattered in small towns or settlements along the Missouri and Mississippi rivers. The western half of the state was almost entirely without towns or population.

There were no roads—only trails winding through the forest and over the prairies. There were no bridges. Transportation by land was as primitive as in Biblical days. Men still traveled on foot or by pack-mules or ox-carts, which creaked over the trails at an average speed of fifteen miles a day. Transportation by water was by canoe, flatboat, barge or keelboat—Missouri had obtained her first astonished and incredulous view of a steamboat only four years before. There were, of course, no railroads—we were to wait thirty years to see the first mile of rails laid in Missouri. It was a day of river towns and river transportation.

In agriculture, Missouri's position is unique. The state affords more varieties of soil than any other state in the Union, and easily ranks first in diversified farming. Corn and cotton, wheat and rice, as well as every other grain grown in the United States, is successfully grown in Missouri. Our poultry products annually equal half the value of the gold mined in the whole United States.

The land surface of Missouri is 68,727 square miles, or 43,985,280 acres, and of this area 79.1 per cent, or 34,774,679 acres, is in farms, and of this latter amount 71 per cent, or 24,832,966 acres, is "improved" as 56 per cent of the entire area. Missouri has 693 square miles of water. Extreme length of the state is 300 miles and extreme breadth 280 miles.

Missouri's acreage of unimproved land at the last United States census was: Unimproved land within enclosed farms, 1,387,856 acres; woodland or timber land within enclosed limits of farms, 8,553,857 acres; land not in any farm under census classification, 9,210,601 acres. The total acreage of unimproved land and water is 19,152,310 acres, or 29,925 square miles. This area—which is more than the combined land and water area of the states of Massachusetts, Delaware, Rhode Island, New Jersey and New Hampshire, offers attractive opportunities to the seeker for cheap lands.

Missouri has 263,004 farms. The average acreage per farm in Missouri is 132.2 acres. The tenant farms average 124.4 acres.

The diversity of resources of the state is well exemplified by this fact: Missouri is the only state in the United States holding high rank in quantity and quality of corn, cotton, wheat and oats; bluegrass and hay; berries, orchard fruits and melons; lead, zinc, barytes, pyrites, cobalt, nickel and iron, coal and ceramic clays and clay products, cement rock, building stone, granite, marble, sand and gravel, walnut and other hardwood timber and pine; cattle, hogs, sheep, horses and mules; poultry and dairy products.

Missouri is "the fifth state" in the average total value of all crops and livestock.

The census places the value of all crops for Missouri at $559,047,856. The corn value was $219,513,084; wheat, $140,202,501; oats, $32,394,961; hay and forage, $95,897,050; potatoes, $10,144,410; sweet potatoes, $2,094,979; cotton and cottonseed, $12,513,445; apples, $9,494,411.

Although a great corn state, in 1922 Missouri's fourth crop in value was cotton. In 1923 the cotton area reached 394,000 acres. The state was first in average cotton production per acre. Missouri farmers never risk carrying all of their eggs in one basket.

Missouri River valley lands have (through a century of agricultural history) proven to be the most certain of producing good crops than any other area of similar size and character in the entire United States. It should not be overlooked that these lands lie closer to central markets than any other Central, Western or Southern state.

Dairy and poultry farmers prosper. No corn-belt state offers anything like the abundance of opportunities for farm advancement and country-life development.

Missouri is first in bluegrass acreage and quality of bluegrass seed. She grows taller and bluer bluegrass as well as heavier bushel-weight bluegrass seed than any other state. In fact, Missouri grows more bluegrass than all the states north of its northern border or south of its southern border.

Missouri does not depend upon the "climate" alone. She offers the broadest opportunities for farming diversification, with the greatest freedom from general crop failures of any state, with thousands of bargains in both raw and undeveloped land totaling millions of acres, especially adapted to successful development in fruit, dairying, poultry and livestock farming. Missouri offers an opportunity and a welcome to many thousands of farm families.

Considered from the standpoint of merit of both grade and purebred cattle, cost of production, cost of grazing, cost of wintering, the large number of days that cattle live outdoors free from extreme heat or cold, nearness to primary markets and shortness of hauls of grain and

forage, Missouri is the first cattle state of the Union.

In mining, the state produces lead, zinc, iron, cobalt, nickel, copper, tungsten, silver, barytes, coal and several other minerals of commercial value. Missouri leads the world in lead production and until recently all other states in zinc. Missouri is the only state in the Union producing nickel, and shares with Idaho the production of cobalt. Half the barytes mined in the United States comes from Missouri. The clay deposits of Missouri are many and valuable, ranging from plastic pottery clay to the so-called diaspore, which analyzes up to 75 per cent alumina. Missouri coal measures underlie an area of approximately 25,000 square miles. Valuable building stone and granites are quarried. The value of the state's mineral output increased from $13,407,000 in 1900 to $64,300,000 in 1922.

Missouri's forest and timber land products are of importance, the last Federal census showing 105,685 farms with forest products, the total value of which was $13,938,458, of which in 1919 $5,374,713 were sold off the farms and $8,563,745 worth used on the farms. Missouri farms, totaling number of 50,734, reported 2,139,530 acres of merchantable timber. There are more than ten millions of acres of the Ozark area suitable for timber development, in which there are wonderful opportunities for investors.

In manufacturing the state has made great strides, now ranking tenth or eleventh among the states of the Union. The list of its manufactured articles includes a multitude of articles ranging from pearl buttons to iron and steel and automobiles, from chewing tobacco to furniture, from cob pipes to stoves and furnaces. The value of her manufactured products has risen from $671,000,000 in 1915 to $1,576,000,000 in 1919. The discovery of a coking coal and the location of valuable iron deposits which can cheaply be brought together at St. Louis hold promise of great development of iron industry and manufacturing.

The list of Missouri's proud possessions could be enormously multiplied—her 8000 miles of railroad, her banking pre-eminence, her churches, her schools, her instruments for the advancement of the state commercially, industrially, mentally, morally. To recount them all would be a pleasant task but well-nigh an endless one. Enough has been said. Let it be added merely that the state's greatest possession is her three and one-half million people—intelligent, industrious, patriotic and honest—who inhabit her farms and cities, turn her wheels, follow her plows, delve in her mines and honor her name.

Missouri will grow enormously as an agricultural state; her 19,000,000 idle acres guarantee that. She will develop as a mining state; her growth in product in the last twenty years attest that. She will become a great industrial state; her wealth of mineral resources, her 25,000 square miles of coal, her vast undeveloped water-power inexorably point to that road of progress.

Secure in the record of her past and present, Missouri lives not in the past but in the future. She counts her possession not as one who lives in the pride of past accomplishments, but as one who stands proudly upon past achievement and bends forward to greater endeavor. He would be a rash prophet who would attempt to describe the Missouri of one hundred years hence. So rapid are the strides of modern life that twenty—even ten—years can bring changes almost revolutionary of thought and habit; but it can be safely said that Missouri has not approached the summit of her achievements, and that her advancement in the next one hundred years will be far beyond our power to foresee or forecast. Indeed, it would be rash to predict the growth of twenty years.

Mineral Resources of Missouri

By H. A. Buehler, State Geologist, Rolla, Mo.

The accompanying table (page 396) indicates the relative importance and the varied nature of the mineral industries of Missouri. While there is a yearly fluctuation in the total value, due to industrial and mining conditions, there has been a continual increase in the value of the output during the past 25 years. In 1898 the total value was only $13,000,000. New deposits are continually being found and new areas developed. During the past four years the discovery of diaspore clay in the northern Ozark region has established an important clay-mining industry on a material running from 70 to 75 per cent alumina.

H. A. Buehler

Work by the Missouri Geological Survey revealed excellent marble in the eastern part of the state which is now being worked extensively, while in the southeastern Ozark region a high-class chinaware clay is now being produced, the first discovery having been made about three years ago. These new mineral industries indicate the future possibility in further development.

The non-metallics contribute more than two-thirds of the present total value, while the metallics, which are found chiefly in the Ozark region, contribute about one-third.

Lead and Zinc

The mining of lead ore is the most important mineral industry in the state. The chief production comes from the disseminated lead district of southeast Missouri. This district has a production of 275,000 tons of concentrates per year, which is the largest production of any district in the country. The Joplin zinc district also produces considerable lead, and sporadic production is obtained from many of the Ozark counties. Developments during the past five years approximately 40 miles south of the main productive field and on the west flank of the granite area comprising the St. Francois Mountains have added a large area of possible productive territory that has not been prospected.

The Joplin lead and zinc district of southwest Missouri, Oklahoma and Kansas is the most important zinc district in the United States. The area in Missouri covers a district 40 miles wide by 100 miles in length, much of which has not been prospected.

The ore occurs in watercourse veins and "sheet ground" deposits extending from the grass roots to a maximum depth of 350 feet.

The upper deposits are usually irregular but compara-

Missouri Lead and Zinc Mill

Missouri Lead and Zinc Mine

tively rich, while the "sheet ground," which is coextensive with brecciated chert horizons, forms blanket-like ore bodies of large extent, but usually of low grade.

Iron Ores

The iron ore deposits of the eastern and central Ozark region have been mined for more than a century. The deposits at Iron Mountain and Pilot Knob in the granite region of the St. Francois Mountains have produced over ten million tons of high-grade specular hematite. Although considered practically worked out and abandoned for a number of years, the Iron Mountain deposit has recently been reopened and developed and will no doubt produce in the future a greater tonnage than in the past.

The red-ore district of the central Ozarks produces a high-grade red hematite from the so-called sink deposits, which are irregular in size, and may produce from a few thousand to a million tons. These deposits occupy old sink holes and are usually developed by open-cut methods.

In the southeastern part of the state limonite, or brown-ore, deposits occur over a large area. The so-called

A Missouri Iron Ore Mine

primary limonite is rather high in silica and comparatively low grade. The secondary deposits, which have been altered from marcasite, are much higher in grade and make an excellent furnace ore.

During the past year two washing plants have been constructed on these deposits, and the future production will, no doubt, be much larger than in the past. The ore usually occurs in the surface clays and outcrops along the ridges of the region. There has been a gradual revival of iron mining in the state, and more interest than for many years is manifested in the possible development of additional deposits.

Cobalt, Nickel and Copper

Extensive deposits of a complex mixture of cobalt, nickel, copper, lead and iron sulphides have been mined at the property of the Missouri Cobalt Company near Fredericktown, Madison county. Similar ore has been found at Mine LaMotte. These deposits have given Missouri the distinction of being practically the only state in which commercial ores of cobalt and nickel are found. An extensive reduction plant has been erected upon the cobalt property, although at present it is not in operation.

The cobalt-nickel-copper ore of the Fredericktown district occurs near the contact of the Cambrian sandstones and dolomites with the Pre-Cambrian granite and porphyry. Much of the contact of this region has not been prospected and there is a possibility of further development of similar deposits.

Recent prospecting for copper ore has been carried on in Shannon county, where some high-grade chalcocite has been obtained in solution channels between porphyry hills. A number of prospects have been opened in the past, but no production has been attempted.

Tungsten

Tungsten has been mined in the western part of Madison county. The ore occurs in the true quartz-fissure vein in the granite. This vein also carried argentiferous galena, which averages 40 ounces of silver to the ton. This mine has not been in operation for the last few years, but prospecting has shown extensions, which, with proper development, would place Missouri again in the producing column.

Barytes

Missouri produces approximately 50 per cent of the barytes in the United States, approximately three-fourths of the output coming from Washington county, with the remainder scattered throughout the northern Ozark region. The ore occurs as chunks in the surface residual clays, and has in the past been mined largely by small test pits and hoisted by hand windlass. Recently steam-shovel and log-washing methods have been introduced and will, no doubt, largely increase the production in the future. The chief points of refining and grinding the raw product are in St. Louis and eastern cities.

Clay-Working Industries

Missouri is noted for its variety of exceptionally high-grade fire clays. Almost every county has clays of value and in many areas it forms a basic industry. St. Louis and vicinity is noted for its fire-brick industry, the clay being obtained from the so-called Cheltenham clay horizon of the basal coal measures. This industry in St. Louis has been established for many years, and during the last decade similar deposits have been opened and large industries established in Audrain and adjoining counties in the east-central part of the state.

A MODERN CLAY-WORKING PLANT IN MISSOURI

In the northeastern Ozark region are extensive areas of flint fire clay. This is a very high-grade clay of a non-plastic nature, which is found in pockets and sink holes throughout an extensive area. During the past four years there has been discovered what is known as diaspore clay, which is a high-grade aluminous material running as high as 75 per cent alumina. At the present time there is a strong demand for this clay, and many deposits are being opened and large production is being made. It is used largely in the manufacture of abrasives and refractories.

Intermediate between the flint clay, which analyzes approximately 40 per cent alumina and the diaspore, there is almost every gradation of aluminum content. These intermediate clays are known in the local field as burly clays.

Near Poplar Bluff in Butler county, in southeast Missouri, a dark plastic chinaware clay has recently been developed, the output being shipped to Eastern markets. This is a Tertiary clay deposited in estuaries from the lowland district to the south, and its discovery has added a new industry to the mineral resources of the state.

In the coal measures of the northwestern half of the state ordinary brick clays and clays suitable for sewer pipe are extensively developed.

The value of clay products was over $11,649,000 in 1922.

Portland Cement

The limestone and shale formations of the Pennsylvanian, Mississippian and Ordovician series are suitable for the manufacture of Portland cement, and large plants have been established at Hannibal, St. Louis, Kansas City and Cape Girardeau. The formations cover a large area in the western, northern and extreme eastern part of the state, and can furnish an inexhaustable supply suitable for use in this industry.

The possible future development of the industry depends only upon transportation and market conditions.

Coal

Approximately 25,000 square miles of the northern and western portion of the state is underlain by the coal measures. Mining extends from the Iowa to the Kansas state line, production being obtained from about thirty counties. The beds vary up to six feet in thickness. In Lafayette and adjoining counties the so-called Lexington coal, which varies from 18 to 20 inches in thickness, is mined extensively. This is one of the thinnest veins mined in the United States in a large way, the production being something over a million tons.

Open Pit Coal Mining in Missouri

Quarrying Industry

The state produces all grades of stone, from the finest marble and granite to rubble and crushed stone used in concrete and construction work. The largest cutstone industry is located at Carthage in Jasper county and at Phoenix in Green county, in the western part of the state. The Burlington formation furnishes an exceptionally high-grade limestone for interior decoration and exterior construction, the production of southwestern Missouri being largely a fine grade marble and dimension stone.

In Ste. Genevieve county in the eastern part of the state an exceptionally fine marble has been produced in the past three years. It has a beautiful brown marking and is known as the "Golden Vein," "Ste. Genevieve Rose" and "Ste. Genevieve Clear." Recently a second deposit has been opened on the Kimmswick formation in Jeffer-

son county to the north on which work is progressing.

Rough granite blocks are produced at Graniteville, the stone being a deep red crystalline granite, which takes a beautiful polish.

The various limestones comprising the sedimentary formations support a large crushed-stone industry, the material being used principally for concrete construction and highway work.

In the southwestern part of the state, near Seneca in Newton county, an extensive quarrying industry is established, the production being tripoli, a material used largely as a polishing powder, for filters and in the foundry industry.

Missouri Limestone Quarry

Decomposed chert, which is also known as tripoli, is quarried in Cape Girardeau and adjoining counties along the Mississippi River, and is used largely for highway construction and railroad ballast.

The chats produced in the southeast disseminated lead district and the Joplin district are used extensively for railroad ballast and concrete. The utilization of this material is limited chiefly by freight rates, as it is a by-product of the mines which can be sold cheaply.

Sand and Gravel

The St. Peter sandstone, extending from the Missouri River to the southeastern part of the state, has been quarried extensively for glass sand, used in the manufacture of plate glass, and the glass-sand industry is well established along this belt.

Ordinary building sand and gravel are found in extensive deposits along all streams in the southern part of the state and in northeast Missouri. There is an extensive industry producing this material for concrete construction and highway work. The state is well supplied with these structural materials.

There are in the Ozark region extensive deposits of pyrite, which have been productive in the past but are not now in operation. The state has a yearly production of silver, obtained from the lead ores of southeast Missouri, which carry approximately one ounce of silver to the ton. The silver is a by-product obtained through the purification of the metallic lead.

In Vernon and the adjoining counties of southwest Missouri there are extensive areas of asphaltic sandstones which have not been developed. It is possible that this material can be utilized in the future in highway construction.

Some oil and gas has been encountered in wells along the western border of the state from Kansas City to the south. At the present time there is practically no production.

Carl G. Schluederberg, chairman membership committee of the American Electrochemical Society, writing of the South, said:

"A better and larger understanding is needed of the immense mineral resources of the South which have, as it were, merely begun to be opened up. Even at this date no one has any clear conception of the vast extent of these resources. It is generally recognized that they are great, but we feel that they are much larger than anyone imagines at this time."

Value of Mineral Production of Missouri, 1915-1922

Commodity.	1915	1918	1919	1920	1921	1922
Lead ore	$14,579,361	$21,988,567	$12,107,731	$20,284,921	$16,207,650	$19,625,320
Zinc	19,625,978	5,473,483	2,429,235	2,142,564	1,084,500	1,843,494
Coal	6,595,918	17,126,498	12,766,366	22,230,000	13,915,500	11,153,000
Clay products	5,428,403	9,198,184	11,016,333	17,443,458	10,867,426	11,649,495
Cement	4,007,697	7,132,470	9,264,017	10,980,453	8,034,540	10,457,557
Limestone	2,049,772	1,359,755	1,759,029	2,776,936	2,269,457	2,409,202
Marble	.....	238,111	360,287	616,550	627,729	816,098
Mineral paints	4,745,246	.....	.....	.....	.....	.....
Sand and gravel	675,684	772,753	873,333	1,356,352	1,018,325	1,063,370
Lime	573,442	1,721,800	1,735,705	2,319,285	1,656,560	1,953,524
Lime, hydrated	.....	201,737	402,620	584,283	487,169	551,187
Clay	641,040	1,192,996	1,004,033	1,413,189	938,135	1,238,622
Chats	346,378	135,319	206,353	167,028	260,000	282,789
Barytes	158,597	393,738	640,398	1,013,570	217,913	421,568
Copper	70,378	142,683	300,799	278,307	17,749	107,649
Mineral waters	83,363	38,478	39,641	50,892	45,670	40,149
Tripoli	68,451	81,728	8,926	.....	.....	.....
Iron ore	99,853	270,337	223,144	230,827	.....	244,928
Granite	85,624	54,523	.....	114,663	81,389	85,093
Silver	29,282	46,939	101,249	121,130	69,902	212,656
Sandstone	10,104	.....	.....	.....	.....	.....
Natural gas	5,077	5,548	3,000	2,600	3,000	2,028
Pottery	3,166	.....	20,817	31,084	89,657	96,513
Miscellaneous and concealed *	37,256	98,489	118,184	169,680	196,108	45,850
Total	$59,821,032	$67,674,146	$55,381,200	$84,327,772	$58,088,379	$64,300,092

* Included under miscellaneous are pyrite, petroleum, pottery, cobalt, nickel, tungsten, sandstone, granite, potash, tripoli and miscellaneous stone.

MISSOURI

Total Area, 69,420 Square Miles; Land, 68,727 Square Miles; Water, 693 Square Mills

	1880	1900	1910	1923
Population	2,168,380	3,106,665	3,293,335	3,443,971
Property, true value	$1,562,000,000	$3,244,533,000	¶$5,727,948,000	†$9,981,409,000
Manufactures:				
Capital	$72,507,844	$223,781,088	$444,343,135	*$938,761,000
Products, value	$165,386,205	$316,304,095	$574,111,070	‡$1,162,006,000
Mines, Quarries and Wells:				
Capital	.....	.....	$60,549,081	*$47,926,850
Products, value	.....	.....	$31,667,525	*$33,365,694
Cotton Manufacturing:				
Spindles, number active	19,312	13,654	38,576	31,648
Looms, number active	431	300	994	730
Cotton consumed, pounds	3,082,000	2,171,000	6,299,000	18,838,000
Cottonseed Oil Mills:				
Products, value	$140,000	.....	$648,000	.....
Furniture Manufacturing:				
Products, value	.....	$3,928,000	$7,380,000	*$16,155,000
Lumber cut, feet	399,744,000	715,968,000	501,691,000	†201,849,000
Mineral Products, value	$4,736,280	$13,407,664	$52,640,054	†$64,300,000
Coal mined, tons	844,304	3,540,103	2,982,433	3,800,000
Iron Ore mined, tons	344,819	41,366	78,341	53,546
Petroleum, barrels	.....	1,602	3,615	.....
All Land in Farms, acres	.....	33,997,873	34,591,248	*34,774,679
Improved Land, acres	16,745,031	22,900,043	24,581,186	*24,832,966
Number of Farms	.....	284,886	277,244	*263,004
Value all Farm Property	.....	$1,033,121,898	$2,052,917,485	*$3,591,068,083
Value Farm Land	.....	$695,470,723	$1,445,982,389	*$2,594,193,271
Farm Products, value	$95,913,000	$219,297,000	$429,669,778	$709,900,000
Farm Crops, value	.....	$121,455,000	$211,001,000	$337,400,000
Cotton Crop:				
Bales, number	20,000	26,000	60,000	115,000
Tobacco Crop, pounds	.....	3,041,996	5,372,738	6,600,000
Grain Crop:				
Corn, bushels	160,463,000	180,710,000	247,500,000	196,860,000
Wheat, bushels	29,563,000	18,847,000	25,958,000	37,947,000
Oats, bushels	25,314,000	24,695,000	40,320,000	34,500,000
Live Stock:				
Cattle, number	2,072,000	2,979,000	2,561,000	2,856,000
Sheep, number	1,411,000	1,087,000	1,811,000	1,205,000
Swine, number	4,553,000	4,525,000	4,438,000	4,463,000
Horses, number	668,000	967,000	1,073,000	861,000
Mules, number	192,000	284,000	343,000	369,000
National Banks:				
Resources	$22,620,287	$179,746,530	$377,602,495	$566,679,000
Capital	$7,200,000	$17,950,000	$35,305,000	$42,020,000
Deposits	$8,391,274	$64,448,555	$143,758,257	$311,204,000
Other Banks, deposits	$33,995,915	$88,660,622	$273,874,000	$765,521,000
Railroad Mileage	3,965	6,875	8,083	†8,059
Highway Expenditures	.....	**$1,570,801	††$5,513,049	$27,550,000
Public Schools, expenditures	$2,675,300	$7,816,000	‡‡$12,769,700	†$40,986,000
Assessed Value Property	$561,939,771	$910,000,000	$1,639,682,240	$4,593,093,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

The Meaning of the Foregoing Figures

THE PROGRESS of Missouri is strikingly indicated in the simple fact that the bank deposits of that state in 1923 were about one-half as large as the total deposits in all the banks of the country in 1880. What a striking illustration of the nation's marvelous growth and increase in wealth is shown in this fact!

Though Missouri's population increased less than 60 per cent between 1880 and 1923, its public school expenditures in 1922 were 15 times as great as in 1880—rising from $2,675,000 in 1880 to $40,986,000 in 1922. The value of farm crops nearly trebled between 1900 and 1923, while the value of all farm property more than trebled.

Opportunities in the South

DR. JOSEPH W. RICHARDS, professor of metallurgy, Lehigh University, has this to say about the South:

"I am an optimist concerning the South. Its industrial development will be wonderful. Let Southern and Northern industrialists and capitalists realize that the opportunity is before them now and not in the far future for the development of important prospects."

North Carolina's Mineral Resources and Their Development

By Brent S. Drane, Director North Carolina Geological and Economic Survey, Raleigh, N. C.

One who considers North Carolina minerals is apt first to be impressed with the great variety in which they occur in widely separated sections of the Piedmont and mountain counties. There are few jewels which cannot be included in a comprehensive collection of North Carolina gems. The state has produced diamonds; there are rubies; the beryls include the unique Hiddenite; the garnets the equally distinctive rhodolite, a gem which gets its name from the rose-pink blush suggestive of the rhododendron; there are pegmatite dikes containing a wide range of rare stones. "The History of the Gems of North Carolina," by George Frederick Kunz, Bulletin No. 12 of the North Carolina Geological and Economic Survey, is a fascinating dictionary of this versatility.

Brent S. Drane

As to precious metals, both gold and silver, it is not generally known that North Carolina was in the earlier days the source of an important part of the national gold supply. Prospectors who rushed to California in '49 had in many cases searched out and worked rich placer mines in Piedmont North Carolina. A century and a quarter ago North Carolina had its gold excitement, when in 1799 a seventeen-pound nugget was found in the old Reed mine near Concord. From this mine there was taken out an estimated $1,000,000 between 1804 and 1846. Other famous gold-producing areas have been that around Charlotte, the Gold Hill District in Rowan county and the Montgomery county district. In fourteen years the Gold Hill mine produced an estimated $2,000,000, and in 1853 had a population of 2000 at its camp. Gold has been produced, or is present in workable quantities, in at least nineteen North Carolina counties, but the industry has declined on account of the exhaustion of the greater number of the placer mines and because in other instances the gold is so combined with other minerals and sulphides as to make its concentration and recovery too difficult to be commercially attractive. There is no doubt, however, that several of these old mines may yet be operated profitably through the adoption of correct methods and proper machinery, and there is a prospect, even, that new methods may bring the ancient placer mines into use again. In fact, capital has for a year or more been quietly invested in the old Coggins mine, where much ore has been prepared and the machinery for extensive operations is now being installed. Gold production of 1923 in North Carolina was nominal—53.3 ounces of a value of $1102—but this by no means implies that the oldest commercial mining industry in the state is exhausted beyond a future. A prospector seeking a "strike" would have only his ramblings for reward, but the state's established gold properties are well worth careful consideration from the point of view of practical, scientific exploration.

In the case of mica, in which North Carolina leads the country, there is a long history, beginning in 1865 immediately after the Civil War, when both mica and corundum began to be made the basis of an important industry which has since continued, with present production of an estimated value of almost $300,000. Mica is perhaps the state's mineral product most anciently mined, investigations of the burial mounds of aboriginal Indians having disclosed ornaments which must have come from North Carolina pits.

Although there are gold, silver, copper and many rare gems and crystals still awaiting recovery in North Carolina mines, the major progress of the state in mineral industries recently has had to do with the less romantic but more profitable non-metallics. These include granite, production of which in 1923 reached an approximate value of $3,500,000; feldspar; clays (including the true kaolin, which enters extensively into the making of chinaware); brick (both high-grade face and chemical brick from shale); sand and gravel; barytes; talc (chiefly pyrophyllite). They include also coal, which is now being produced in one field of considerable extent and great promise to the amount of about $300,000 value per year, all of which is at present taken by a single railroad. Activities in North Carolina minerals, indeed, center more and more around the building trades, as is natural in a time when construction, road building and manufacturing are more and more absorbing the energies of the people. There are in these fields of the industrial use of mineral wealth abundant opportunities for development. In the clays alone there are unlimited supplies of great variety suitable for practically all uses and inviting to employment within the state in new industries. Marbles—especially the distinctive product trade-named "Regal Blue" of Cherokee county—constitute an industry of growing importance. In addition to the sand and gravel used in such quantities in the road-making projects, there is renewed interest in molding sands, interesting deposits of which are from time to time discovered.

The extent to which the production of these mineral is increasing may be seen in the figures for granite and stone values in 1923, $3,551,778, against $2,325,940 in 1922; brick and tile, $2,999,822 in 1922; sand and gravel, $1,414,537, against $634,434 in 1922; feldspar, $360,636, against $333,745 in 1922; talc and soapstone, $89,290 in 1923, against $29,049 in 1922; limestone, $202,573 in 1923; in clays and kaolins the value of the product has increased in ten years from $139,644 in 1913 to $369,518 in 1923.

The production figures given in the accompanying table are gathered by co-operation with the producers and represent the values the different producers reported. Many of the products, as mica and feldspar, have their value greatly increased by being cut or ground before leaving the state. The value of these minerals to the state is often a great deal more than their original value to the miners.

The table on the following page showing figures for production in 1923, so far as they are now available, and those for 1922, will give a good idea of the healthy condition and variety of pursuits featuring North Carolina's

utilization commercially of its varied mineral resources:

MINERAL OUTPUT OF NORTH CAROLINA, 1922-1923

Mineral	1923	1922
Asbestos	.....	.....
Barytes	$7,076	*
Brick and tile (not complete)	.....	$2,999,822
Clay (kaolin and pottery)	369,518	214,692
Coal (not complete)	.....	388,000
Copper	9,112	.....
Feldspar †	360,636	333,745
Garnet *	.....	*
Gold	1,102	1,989
Granite	3,551,778	2,325,940
Iron	161,603	49,415
Marl	6,000	
Marble	72,650	288,341
Marl	6,000	
Mica (sheet)	188,317	119,767
Scrap	104,178	65,923
Millstones *	.....	*
Mineral waters	7,840	9,941
Peat	.....	*
Pottery (not complete exceeds 1922)	.....	12,488
Precious stones (not reported)	.....	.....
Quartz *	.....	.....
Sand and gravel	1,414,539	634,434
Sandstone (quartzite)	.....	.....
Silver (nominal)	.....	.....
Talc and soapstone	89,290	29,049
Miscellaneous	4,580	15,800

* Included under miscellaneous.
† All feldspar represented as crude.

ABUNDANCE OF POTTERY CLAYS, BUT MORE CARE NEEDED IN HANDLING THE PRODUCT

Outside the fundamental building and construction materials, which must furnish the predominant use of North Carolina minerals, it is in connection with the kaolins and other clays suitable for pottery that there is greatest opportunity for new enterprise and development in the state. Several counties, notably Mitchell, Yancey, Jackson, Macon and Clay, are now producing kaolin in quantity—the dense white, soapy clay so extensively used in the manufacture of white china. Shipped to works in Ohio, New Jersey and other states, these North Carolina kaolins are utilized in the manufacture of china, semi-porcelain and porcelain, in mosaic and other varieties of tile, and also in the manufacture of spark plugs. They are also extensively used, in some grades, as a filling for paper.

What is needed in developing the fine kaolin clays into an industry of real magnitude is, first of all, simple care of the raw product. For although the North Carolina kaolins, occurring in a residual nature in decomposed veins of pure feldspar, pegmatite or granite, are among the purest forms of the clay, many potters find difficulty in using them on account of impurities. Some of the product marketed contains gritty material or coloring matter which produces specks and undesirable shades when burned. As a result, not only is the market for what is an essentially high-grade and very valuable product limited unduly, but the prices obtained are not in keeping with its true quality. In only a few instances are these clays and kaolins properly washed before being sent to market, with the result that they are compromised in reputation with the industry. To secure the activity the quantity and quality of these fine clays deserve, the trend of profitable development lies, first, in more thorough preparation before shipment, and, second, in beginnings toward the establishment of pottery and chinaware works to make use of them in localities near the point of production. For such future enterprise there is the basis of a large body of mentally keen and traditionally predisposed white labor, which has shown itself capable of development into skilled crafts in pursuits that call for a degree of artistic appreciation. Western North Carolina has in late years produced workers of rare skill in such arts as weaving, and there are in the western part of the state and in the Piedmont many localities where the potter's wheel, in the making of beautiful examples of art potteries from clays containing oxides, has survived for generations.

What is true of the clays and kaolins also applies to feldspar, of which the state is a producer of the first rank. Most of the production of Carolina feldspar is now sold in the raw state, without grinding, a practice which adds to the cost of marketing at distant points and greatly reduces the financial return. An encouraging development in connection with the whole question of clay and feldspar production is the establishment at State College in Raleigh of a department of ceramics under the direction of Arthur F. Greaves-Walker, an internationally recognized expert. The college will maintain a test laboratory to which samples of clay can be sent for thorough analysis and opinion and information as to the character and possibilities of these deposits spread. Ceramics is one of the very few industries whose future is of a positive nature in North Carolina, in which the field is at present, practically speaking, unoccupied.

Use of limestone, and of marl, of which there are great quantities in several sections of the state, has of late years been neglected as a basis of fertilizer manufacture. There was a beginning made in connection with these beds during the war, but operations have been discontinued since they were started by the State Department of Agriculture in the effort to meet the war-time emergency. What a state would naturally abandon as a business after the crisis had passed makes an interesting field for private investigation and initiative.

DEVELOPING THE STATE'S UNIQUE COAL FIELD

One of the most interesting features of progress in development of North Carolina minerals at present is the work going on in what is called the Deep River coal field, where three companies are now producing a total of around $300,000 in value a year, all of which is taken for the use of the Norfolk & Southern Railroad. Deep River coal is by no means a discovery, since it was known even in colonial days and was made the basis of numerous projects for the improvement of the Cape Fear River in pre-railroad times, with the idea of connecting it with the sea through the port of Wilmington. Situated in Chatham, Moore and Lee counties, this field contains on the whole an amount of coal which there has been no attempt accurately to estimate. Two years ago the United States Geological Survey made a report through Messrs. M. R. Campbell and K. K. Kimball as to its extent and the commercially recoverable content of a part of the field which they investigated. According to this report, which sustained a previous preliminary examination by the North Carolina Geological and Economic Survey, there has been ascertained recoverable coal to the amount of 67,000,000 tons which can be profitably mined to a depth of 2000 feet. The area in which prospecting and development has been going on is on or near Deep River, from Glendon to the point where Deep River and Haw River unite to form the Cape Fear.

Deep River coal has been neglected with the exception

of sporadic activity, chiefly because of its highly volatile character and the former abundance and cheapness of cleaner coals for domestic and industrial purposes. It is, however, under conditions of modern use, proving valuable as a steam coal and could easily be briquetted for domestic use. In fact, as stated above, it is being used constantly by a railroad, which purchases the entire present output. A feature of the report of Messrs. Campbell and Kimball is their conclusions as to the chemical composition of Deep River coal. For instance, it contains approximately 2 per cent of nitrogen, which could be obtained in the form of ammonium sulphate as a by-product in coking, to yield approximately 23 pounds per ton. Tests also showed a very good quality of coke, fairly equal to Freeport or Pittsburgh standards. In addition to by-products, including dehydrated tar of 22 gallons per ton, the gas content of Deep River coal has a possibility of use in generating electric power for transmission, there being abundance of water near at hand and an existing large hydro-electric and auxiliary steam station in the vicinity.

That portion of the report having to do with geologic formations and structure finds the coal beds are associated with sandstones and shales of Triassic age and belonging to the Newark group, consisting of three parts: a lower formation, to which the name "Pekin" has been given, composed largely of red and brown sandstone; a middle formation of light-colored or drab shale, sandstone and coal beds, to which has been given the name "Cumnock," and an upper formation called the "Sanford," consisting mainly of red conglomerate of great, though unknown, thickness.

The Iron Ores of North Carolina

Iron ores are more or less widely distributed throughout Piedmont and western North Carolina, and have been from time to time produced profitably. In the main, however, economic conditions, transportation difficulties, etc., have been factors preventing large developments. The chief deposits of these ores are, roughly, the magnetic ores of Avery and Ashe counties and the brown ores of Cherokee county. The former is extensively mined as a producer for the Cranberry furnaces in Tennessee; the brown ores must await changing conditions before they will be commercially available to any great extent.

North Carolina magnetic ores are of three types, all in rocks of pre-Cambrian age—hematitic magnetites, titaniferous magnetites and non-titaniferous magnetites. Of these the first group is not at present of importance as a source of iron ore, since the quantity available is too small to justify the expenditure necessary to place it on the railroad. The titaniferous magnetites occur in the mountain district and in the Piedmont and some of the deposits are comparatively large; but so long as there are non-titaniferous magnetites available, they cannot enter into competition.

It is the non-titaniferous magnetites which promise most, and of these the Cranberry vein in Avery county is most important, extending into Carter county, Tennessee. This vein continues for five and a half miles northwest of Cranberry, and in it are lenses of ore which have been opened at the Wilder, Teegarden, Peg Leg and other mines. A conservative estimate of the ore existing in the vein between the Peg Leg and Cranberry mines is 2,500,000 tons for every 100 feet depth.

In Ashe county there are deposits of non-titaniferous ore on New River, about 500,000 tons of merchantable ore, and at Lansing, where there are available, about 225,000 tons. The last deposit, though small and with small iron content, finds a ready sale for its ore because the gangue is marble. The ore consists of grains of magnetite in a white marble that contains, in addition to magnetite, small amounts of phlogopite, actinolite and quartz.

Near the Deep River coal field is another old industry which is gaining new life and holds rare promise of development. It is a field of deposit of pyrophyllite, so-called talc, some twenty-two miles in length and two to three miles wide. In 1923 there were produced from it 6491 tons of a value of $89,290, as compared with a production in value of $29,049 in the preceding year. Among the multitude of uses of the true magnesium talc, there are not more than one or two cases in which the pyrophyllite will not fill the bill. This aluminum silicate finds a market for such varying purposes as roofing, paper filling, sizing and bleaching, soap and toilet articles. It has been used as a talc powder with success, and in that form brings a high price. There is at present one company operating, another is to resume operations, and a third company is preparing to open a plant in the field which, like Deep River, has been known and worked intermittently for generations.

North Carolina's Hydro-Electric and Steam Power Development

Although water, the mineral of motion and the only natural resource in which conservation and use are both one hundred per cent possible, is not generally considered a mineral when translated into terms of power, the place the rivers and streams of North Carolina have come to take in industry of all kinds excuses a brief relation of the power situation in the state. In one instance, the great reduction plant of the Aluminum Company of America, water-power plays a great part, the extensive development at Badin sending its total energy into this industry.

North Carolina now has developed water-power amounting to 540,000 horsepower, as compared with 450,000 horsepower in 1922, an increase of 12 per cent for the year.

This is a greater amount of installed horsepower than there is in any of the other Appalachian states, and in addition it is estimated that there are undeveloped 1,000,000 primary horsepower on streams draining west of the Blue Ridge, capable of supporting installed horsepower of 1,500,000 to 2,000,000. On streams east of the Blue Ridge it is estimated that there is from 220,000 to 250,000 undeveloped horsepower, capable of sustaining a possible installed horsepower of 400,000.

These striking facts as to water-power gain emphasis from consideration of other facts relating to output of electrical energy in North Carolina from both water-power and steam.

For several years the North Carolina Geological and Economic Survey has published annually a circular descriptive of the power situation. In the last of these it was pointed out that although an earlier estimate of an output of a billion kilowatt hours by 1925 had been exceeded in 1923, the increase in energy came in far greater proportion from steam than from development of water-powers, great as that has been in actuality.

Thus, although the output of electrical energy increased from 732,627,490 kilowatt hours in 1920 to a total of 1,313,098,000 kilowatt hours in 1923, in the latter year over one-fourth, or 234,808,000 kilowatts were produced by steam plants, as against a total of only 51,454 kilowatt hours produced by fuel in the year 1920.

These facts indicate that, with the great resource of undeveloped power west of the Blue Ridge, there will be either created in the western counties a great new indus-

trial region comparable to the Piedmont, or the power of the western streams will in the future be carried to the Piedmont and the East. It will be understood that much of the electrical energy produced by steam is that derived from auxiliary plants of hydro-electric companies, but the fact that consumption of fuel for this purpose rose from 118,864 in 1920 to 327,120 tons in 1923 makes the relation of steam, and thus coal, to water-power development highly significant, especially in making for a well-rounded development of the South's super-power system.

Incidentally, it is a circumstance that, while yet entirely unrealized, can be taken into consideration in connection with the Deep River coal field as a source of domestic supply of fuel in the future.

Acknowledgment is made to Dr. Jasper L. Stuckey, Assistant Geologist, and Mr. Robert L. Gray, editor of the Survey's publication, "Natural Resources," for their essential contributions to this article.

NORTH CAROLINA

Total Area, 52,426 Square Miles; Land, 48,740 Square Miles; Water, 3,686 Square Miles

	1880	1900	1910	1923
Population	1,399,750	1,893,810	2,206,287	2,686,325
Property, true value	$461,000,000	$681,982,000	¶$1,685,408,000	†$4,543,110,000
Manufactures:				
Capital	$13,045,639	$68,283,005	$217,185,588	*$669,144,000
Products, value	$20,095,037	$85,274,083	$216,656,055	‡$665,118,000
Mines and Quarries:				
Capital	.....	.....	$5,985,112	*$2,250,434
Products, value	.....	.....	$1,358,617	*$2,744,583
Cotton Manufacturing:				
Capital	$2,856,000	$33,012,000	$96,993,000	*$268,323,000
Products, value	$2,554,000	$28,373,000	$72,680,000	*$318,368,000
Spindles, number active	92,385	1,134,909	3,163,199	5,463,547
Looms, number active	1,790	25,469	55,600	76,974
Cotton consumed, pounds	11,833,000	190,139,000	317,467,000	646,921,000
Cottonseed Oil Mills:				
Capital	.....	.....	$4,432,010	*$14,586,456
Products, value	.....	$2,676,871	$8,504,477	*$46,995,107
Furniture Manufacturing:				
Products, value	.....	$1,023,000	$1,547,000	*$29,725,000
Pig Iron made, tons	.....	¶¶38,049	¶¶49,490	.....
Lumber cut, feet	241,822,000	1,278,399,000	1,824,722,000	†936,248,000
Mineral Products, value	$575,679	$1,458,848	$2,616,131	†$7,268,000
Coal mined, tons	350	17,734	.....	.....
Iron Ore mined, tons	.....	***	65,278	†††
All Land in Farms, acres	.....	22,749,356	22,439,129	*20,021,736
Improved Land, acres	6,481,191	8,327,106	8,813,056	*8,198,409
Number of Farms	.....	224,637	253,725	*269,763
Value all Farm Property	.....	$233,834,693	$537,716,210	*$1,250,166,995
Value Farm Land	.....	$141,955,840	$343,164,945	*$857,815,016
Farm Products, value	$51,730,000	$89,310,000	$176,261,942	$513,400,000
Farm Crops, value	.....	$68,625,000	$131,072,000	$436,800,000
Cotton Crop:				
Bales, number	390,000	550,000	706,000	1,020,000
Tobacco Crop, pounds	.....	127,503,400	138,813,163	386,400,000
Grain Crop:				
Corn, bushels	36,954,000	29,790,000	49,290,000	58,568,000
Wheat, bushels	4,871,000	5,961,000	6,817,000	6,038,000
Oats, bushels	5,515,000	5,046,000	4,022,000	5,082,000
Live Stock:				
Cattle, number	607,000	625,000	701,000	631,000
Sheep, number	462,000	302,000	214,000	82,000
Swine, number	1,454,000	1,300,000	1,228,000	1,159,000
Horses, number	134,000	159,000	166,000	163,000
Mules, number	82,000	136,000	175,000	260,000
National Banks:				
Resources	$8,420,060	$15,362,182	$55,155,374	$192,329,000
Capital	$2,501,000	$3,043,500	$8,010,000	$13,557,000
Deposits	$2,883,365	$7,477,057	$26,268,062	$125,170,000
Other Banks, deposits	$1,596,632	$9,280,798	$41,240,000	$219,972,000
Railroad Mileage	1,486	3,831	4,932	†5,382
Highway Expenditures	.....	**$624,381	††$5,215,491	$36,148,000
Public Schools, expenditures	$376,000	$950,300	‡‡$2,796,000	†$22,079,000
Assessed Value Property	$156,100,200	$306,579,715	$613,000,000	†$2,576,338,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Includes Missouri. ***Included with Georgia. †††Included with Maryland.

Oklahoma—The Wonder State of the Southwest: Its Progress and Prospects

By Hon. Martin Edwin Trapp, Governor of Oklahoma.

During the War Between the States the Five Civilized Tribes cast their lot with the South. The penalty they paid was the loss of the western half of their lands.

When the new treaty was signed in 1866, Allen Wright, a Choctaw Commissioner, said to the Government officials: "You have taken away our land. Will you not permit us to keep the Indian name?"

Martin Edwin Trapp

Thus was the name of Oklahoma born and entered in the records and the first step taken toward the creation of a great Commonwealth. "Oklahoma" means "Red People."

Nearly a quarter of a century later real settlement began in the first of a series of spectacular "runs" which caught the attention of all America. Seventeen years ago statehood came, and the two halves of the old Indian Nation, divided in 1866, were reunited for all time.

The active development of Oklahoma, so far as population, determined resources, agricultural production and business are concerned, is therefore a matter of about 35 years. In that short space its virile citizenship, drawn from among the enterprising of all states, have brought this state well in the front rank of lusty American Commonwealths. Oklahoma stands fourth among Southern states in percentage of native white citizens.

Agriculture is its foundation. Oklahoma this year stands third among all states in the production of wheat and second in the production of cotton. It is first in broomcorn and second in the production of grain sorghums. With 191,000 farms, its percentage of tenancy has been reduced three per cent in the last 10 years. The present year of good crops and fair prices should result in still more progress toward owned homes and away from the problems of a transient agriculture. The state is now third in the South in value of farm property.

Oklahoma farmers are becoming better farmers as the years go by. There is a steady increase in terracing, in the use of legumes for soil building, in the diversification of crops and in the percentage of the farm living which is grown at home. Every year sees the agriculture of Oklahoma on a more sound basis with a greater influence on the permanent prosperity of all the people.

I am proud of Oklahoma's rank in education. This state stands first among the 16 Southern states in percentage of school enrollment of all children. Although eighth in population, among the same states Oklahoma is second in percentage of literacy, third in expenditures for public schools, fifth in value of school property per child and second in per capita college attendance. The resident attendance at the University of Oklahoma and the Oklahoma Agricultural College has increased 70 per cent in five years.

In past years Oklahoma has been somewhat laggard, as compared with Eastern states, in the matter of road building. Too many other necessities stood out for attention in the earlier years of a new state which had to develop itself in a quarter-century or so to the degree demanded by settlers from other states with a century of growth behind them. Because of climatic conditions, also, dirt roads are good roads in Oklahoma during the major portion of the year.

Within the last 10 years, however, real road-building activity has been begun. There are today in use 854 miles of hard-surfaced roads, while 383 additional miles are now under construction and several additional miles are in promising prospect. Oklahoma has a thoroughly capable highway commission, under whose auspices the largest amount of road building and road maintenance activity known in the history of the state is being carried out on a sound basis with a gasoline tax, auto license fees, Federal aid and county bond issues as the major financial foundations.

Manufacturing and industrial development, while yet not to be compared with some of the older states in which the city population forms a larger proportion of the total, has shown a greater rate of progress within the last 10 years than that of any Western state. The number of persons employed in manufacturing establishments has increased 250 per cent in 10 years, while the horsepower used has increased 300 per cent and the capital invested 500 per cent. The figures are approximate, but close enough to indicate the general rate of growth.

In the matter of annual production from natural resources, all the world knows that Oklahoma consistently ranks either first or second in crude oil, but a less number have never been informed that the same state is first among all states in the production of zinc and second in the production of lead.

Among the Southern states Oklahoma is second in number of telephones, seventh in assessed valuation, fourth in miles of railroad, third in number of automobiles and sixth in number of homes in which electricity is used, always remembering in connection with such figures that in the same classification the state is but ninth in population.

These figures mean most when interpreted in terms of citizenship, for it is men who build cities and develop states. Natural resources are the foundation on which they build. Annual production may be said to represent the material with which they build. The structure itself is the citizen who is developed in the building. The figures given above with reference to educational facilities and school attendance may indicate to others, as it does to us, that the Commonwealth of Oklahoma is being erected on a sound foundation, of good materials, and that it will add to the strength of the nation in every time of need.

Oklahoma Schools and Churches

One of the first things to strike a thoughtful visitor to Oklahoma twelve to fifteen years ago was that however small the town he saw, the most imposing structure was the public school building, and the next was the character, size and costliness of its churches. When one Oklahoma city had only about 40,000 population, it had on one street within about six blocks five church buildings costing in the aggregate about $800,000 to $1,000,000, constructed at hardly one-half of present building cost.

Oklahoma's Hidden Treasures

Vast Dormant Mineral Wealth Still Lies Untouched

By Chas. N. Gould, Director Oklahoma Geological Survey, Norman, Okla.

Two statements regarding Oklahoma's mineral wealth may be made with confidence. First, no equal area of the earth's surface, during recorded history, has made such rapid and substantial development in the value of its mineral resources as has the state of Oklahoma since the beginning of the Twentieth Century. Second, the development of Oklahoma's mineral wealth is today yet in its infancy.

Chas. N. Gould

These are comprehensive statements and should not be made unless they can be substantiated. Permit me, for your information, to submit the following facts:

From a valuation of $5,000,000 in 1901, Oklahoma's mineral resources have increased to an average value of $357,000,000 per year for the past six years. If my mathematics are correct, this is an increase of about 7040 per cent. The total valuation of Oklahoma's minerals to date is $3,035,000,000.

Oklahoma Second in Mineral Output

Among the states of the Union Oklahoma has been ranking third in mineral production for several years, being exceeded only by Pennsylvania, with her anthracite, and West Virginia, with her vast stores of bituminous coal; but, according to the latest Government report, in 1922, the last year for which complete statistics are available, Oklahoma's mineral wealth exceeded that of West Virginia by $11,000,000, thus placing Oklahoma in second place.

Study the chart which accompanies this article. Note the rapid and steady increase in the valuation of mineral products of Oklahoma, which started at $5,000,000 in 1901 and increased to $490,000,000 in 1920. After the slump in prices following the war, Oklahoma's valuation fell to normal, but has again steadily increased until the best estimation of the 1923 mineral valuation is $410,600,00.

It may be objected that these comparisons are unfair to the older states. Possibly so. At the beginning of the century the present state of Oklahoma consisted of two Territories, Oklahoma and Indian Territories. It was not until 1907 that we secured statehood. That year our mineral wealth was about $25,000,000. Oil had already been discovered in both Territories, and from that time on the development of the mineral wealth increased so rapidly that one could scarcely keep up with it, culminating, as before stated, in 1920, when the production reached almost half a billion dollars.

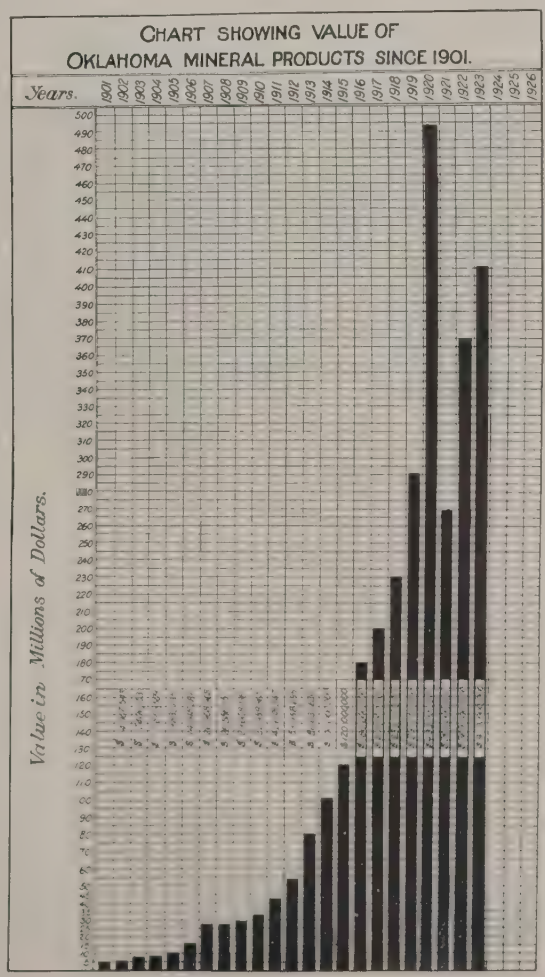
Do these figures tell the story? Only in part.

Twenty Valuable Minerals in Commercial Quantities

Oklahoma has in known commercial quantities within her boundaries more than twenty valuable mineral products, including the following: petroleum, natural gas, zinc, lead, coal, asphalt, clay, gypsum, salt, granite, limestone, marble, sandstone, glass sand, building sand, Portland cement rock, volcanic ash, tripoli, novaculite and manganese.

The developed oil and gas fields, which a few years ago were confined to a small area in the northeastern part of the state, have gradually spread west and south until now forty-three counties out of the seventy-seven in Oklahoma produce oil or gas. There are those who believe that deep drilling will show that oil occurs in practically every part of Oklahoma except, possibly, in the heart of the mountain uplifts.

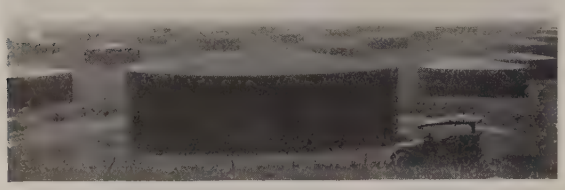
There may be those who will point out that oil and gas are ephemeral resources and that they will soon be exhausted. Granted; they may be. The life of a gas field rarely exceeds ten years; an oil field lasts possibly twice as long. However, there need be no alarm regarding the rapid exhaustion of Oklahoma's oil and gas. There is still a vast amount of these substances in the ground, only awaiting the incoming of capital, proper development and utilization, and each year as I watch with amazement the discovery of new fields in regions undreamed of a



PUMPING 18 WELLS FROM ONE POWER PLANT IN AN OKLAHOMA OIL FIELD

decade ago, and the continued development of the industry, I am more and more convinced that men whose grandfathers are yet unborn will still be extracting oil from the ground in Oklahoma. Let us admit, however, that it is true that our oil and gas will eventually be exhausted. If Oklahoma had nothing else to fall back on, it might well be argued that the state was destined soon to lose its pre-eminence among the wealth mineral-producing states.

Of the twenty or more valuable mineral products in



Oklahoma Oil Tank Farm. Capacity of Tanks 35,000 Barrels Each

Oklahoma, development has little more than begun on scarcely half of them. Using the latest complete, available figures, those of 1922, the value of the mineral wealth of Oklahoma may be classified as follows:

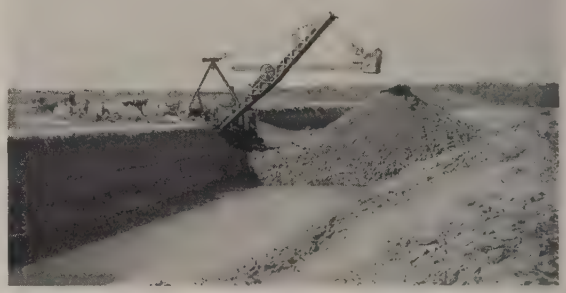
Petroleum	$258,000,000
Natural gas	33,000,000
Natural-gas gasoline	25,000,000
Zinc	23,000,000
Coal	11,000,000
Lead	6,000,000
All others	9,000,000

It will be seen that while the total annual mineral wealth of Oklahoma is approximately $365,000,000, petroleum and its allied products produce $316,000,000, about 87 per cent.

Oklahoma Has Vast Coal Resources

One does not need to point out that power is the basis of modern civilization, and that without power the present civilization, as we now know it, would be impossible. It naturally follows that the state which possesses adequate resources of power has a tremendous advantage over the state that must import these sources of power. The chief source of power is fuel, and it goes without saying that the state with abundant dormant fuel resources is destined to take and maintain front rank among the industrial states and to far outstrip her sister states that are not so fortunate. Let us, then, examine the facts. What has Oklahoma to offer in the way of undeveloped sources of power that may take the place of oil and gas when the latter have all been taken from the ground?

The answer is coal. Fifteen counties of eastern Oklahoma are now producing coal, but the average amount mined each year does not exceed 3,000,000 tons, valued at from $11,000,000 to $15,000,000. Oklahoma has ten workable veins of coal, and the United States Geological Survey is authority for the estimate that there are 79,000,000,000 tons of coal located in the hills of the state. At the present rate of consumption this is enough to last for 26,000 years. So that when and if our oil and gas



Mining Oklahoma Coal by Strip Pit Method

have become exhausted, Oklahoma will still have enough coal on hand to last for untold generations.

Asphalt in Enormous Quantities

Take another product allied to petroleum, namely, asphalt. No one, so far as I know, has ever ventured to make an estimate of the total number of billions of tons of asphalt in Oklahoma, but all who have studied the problem have agreed that the quantity of this material is enormous.

Asphalt occurs sometimes in the liquid form, and as such is pumped from wells. Usually, however, it is found in the solid form as rock impregnations. Often it is contained in ledges of rock sharply tilted which have become saturated with asphalt. The farther one follows these ledges downward into the ground, the richer in bituminous material the product becomes. Sometimes the asphalt has come to the surface along fault lines, impregnating the rock on either side of the fault. Sometimes it is in regularly bedded sandstone ledges which evidently were at

one time oil sands, that have been brought to the surface by erosions, the lighter oils and gases having escaped, leaving behind the heavy asphaltic residue.

Asphalt occurs in one form or another in more than a dozen counties in southern Oklahoma. It has been developed to only a limited extent and in a very desultory manner. When properly treated Oklahoma's rock asphalt makes very high-grade street-paving material. The liquid and viscous substances find ready market for roofing and for the manufacture of various articles.

Zinc

It may not be generally known that in the matter of zinc the value of the Oklahoma product in 1922 was in excess of $23,900,000, including about two-thirds of the valuation of this product in the United States. The greater part of this zinc so far obtained has been mined in a relatively small area in northeastern Oklahoma. How much ore remains in the ground in this area no one knows, but it is certainly enough to last for many years. In addition, there are very large deposits of zinc in the Arbuckle Mountains in southern Oklahoma. This ore, however, occurs in such fine crystals and is so finely disseminated among the rocks that it has not been found profitable to extract it by the ordinary jig methods. This vast undeveloped wealth awaits the ingenuity of the metallurgical engineer to devise a profitable method of extraction.

TEN YEARS AGO A BARE PRAIRIE OF OKLAHOMA—NOW CENTER OF WORLD'S LARGEST ZINC FIELD

Lead

So with lead. In 1922 Oklahoma produced nearly $7,000,000 of lead, and no one can even estimate as to how much more remains unmined.

Building Stone

Of various kinds of building stone, Oklahoma possesses inexhaustable quantities. The Wichita Mountains in the southwestern part of the state, sixty miles long and twenty miles wide, are made up of high-grade red and black granite. There is enough granite in the Wichitas to construct all the building of all the cities of America for a hundred years, with plenty left over to work up into monuments that might be used throughout the civilized world. In the Arbuckle Mountains there is an area of over one hundred square miles occupied by granite, and no finer building stone can be found anywhere. Practically all this great product is undeveloped. A few quarries have been opened and a number of buildings, including the basement of the State Capitol Building of Oklahoma, have been constructed of this stone, but not one ten-thousandth part of 1 per cent of the granite of Oklahoma has yet been utilized.

Sandstone

Practically every county in the state contains sandstone in abundance, and hundreds of local quarries have been opened. At one time or another much sandstone has been taken out for the construction of stone houses in many sections of the state. Eastern Oklahoma has gray and brown sandstone of Pennsylvanian age, while in the western area the Permian sandstone is red.

Limestone

Five widely separated regions in Oklahoma contain large quantities of limestone. The amount available has never been estimated, but it is, for practical purposes, inexhaustable. This stone is used locally for crushed rock, for making concrete and for road material, and sometimes for building purposes. One quarry near Bromide in the southeastern part of the state produced high-grade bolitic limestone which rivals the famous Bedford stone. Much of the limestone is suitable for burning into lime, but practically no lime is now being manufactured in the state.

Marble

Near Marble City in Sequoyah county there is a very large deposit of high-grade marble, which at various times has been quarried and used for building stone.

Glass Sand

The glass-sand deposits of Oklahoma are known to be among the most extensive in the United States. While glass sand occurs in limited quantities in several parts of the state, particularly in northeastern Oklahoma, the largest deposits are in the Arbuckle Mountains. A forma-

THE OLD AND THE MODERN IN ZINC WORKS

tion 2000 feet thick, known as the Simpson sandstone, contains several ledges, each of which is one hundred feet thick or more, of very high-grade silica. No one has estimated the number of billions of cubic yards of glass sand contained in the Simpson formation, but the quantity may be appreciated when the statement is made that the Simpson outcrops almost continuously around the periphery of the Arbuckle Mountains, which are about sixty miles long and average twenty miles in width. Only a small amount of the glass manufactured in Oklahoma at the present time is made from Oklahoma glass sand, the greater part of the sand being imported from other states.

Building sand is abundant in practically all parts of the state, and road material is common in most of the counties.

Portland Cement Rock

Oklahoma possesses very large quantities of Portland cement rock. Both limestone and clay of suitable quality and in practically inexhaustable quantities are present in many parts of the state, closely adjacent to fuel, both gas and coal. Two plants have been in operation for several years, one at Dewey near the Kansas line, the other at Ada in the southeast-central part of the state.

Clays

The state has a great abundance of clay products. Last year approximately 77,000,000 brick, worth $2,700,000, were manufactured, but at the same time much brick was imported from neighboring states. Practically nothing has been done in the manufacture of sewer tile, of which this state is using very large amounts. At no time have we produced any but a very small portion of the building tile used in this state. Clay suitable for the manufacture of all these products in practically inexhaustable amounts is common in many parts of Oklahoma.

Gypsum

Oklahoma leads the United States in the amount of undeveloped gypsum. An estimate made some years ago indicates that there are in the western part of the state approximately 123,000,000,000 tons of gypsum, which is enough to keep one hundred mills, each manufacturing one hundred tons a day, busy for 34,000 years. Very little of this material has yet been utilized and a considerable portion of the gypsum used in Oklahoma comes from adjacent states.

Salt

Of salt Oklahoma has a great abundance. There are in the western part of the state seven regions of salt plains where numerous springs flow a saturated solution of salt brine, now going to waste, contaminating the streams, rendering the water unsuitable for irrigation and in some cases making the water so salty that the cattle and horses cannot drink it. It has been estimated that there is enough of this water to manufacture one hundred carloads of salt a day, and practically none of it is utilized. We people of Oklahoma are using Kansas salt and Texas salt and Michigan and New York salt, but very little salt produced in Oklahoma.

Tripoli

Some of the largest deposits of tripoli in the world are located along the Missouri-Oklahoma line in the north-

eastern part of the state. Throughout a number of the counties there are extensive beds of volcanic ash used for cleansing and scouring material, very little of which is being used. In the southeastern county, McCurtain, there are great ledges of novaculite, which is a very fine-grained sandstone used chiefly for jewelers' stones and mechanics' fine oil stones, none of which has yet been developed.

Have I proved my statements? Have I shown that the materials are here? Have I demonstrated that Oklahoma possesses, locked up in her hills, vast amounts of mineral resources awaiting development?

What Oklahoma needs today is more factories, more workmen and larger payrolls. The raw material is here. The fuel is here with which to manufacture it. The market is here. Over two million people, active, energetic, progressive, are anxious to utilize the various mineral products, but because of the fact that we are not yet manufacturing our mineral resources these people are compelled to send a great part of their money out of the state to purchase those things that in all justice should be produced here at home.

Oklahoma welcomes capital—she surely welcomes new citizens and new ideas. With a fertile soil equaled by few neighboring states, producing crops valued at $300,000,000 a year, with a healthful climate and a progressive people, with a larger variety and a larger amount of valuable minerals than almost any other state, Oklahoma is pre-eminently the land of opportunity. The rapidity of its development proves the energy of its people.

OKLAHOMA

Total Area, 70,057 Square Miles; Land, 69,414 Square Miles; Water, 643 Square Miles

	1900	1910	1923
Population	790,391	1,657,155	2,162,079
Property, true value	$811,580,000	¶$3,117,546,000	†$3,993,524,000
Manufactures:			
Capital	$4,054,391	$38,872,938	*$277,034,000
Products, value	$8,133,936	$53,682,405	‡$283,764,000
Mines, Quarries and Wells:			
Capital	.....	$70,696,411	*$740,757,178
Products, value	.....	$25,637,892	*$351,924,039
Cotton Manufacturing:			
Spindles, number active	.....	5,800	5,712
Looms, number active	.....	250	64
Cotton consumed, pounds	.....	1,029,000	5,897,000
Cottonseed Oil Mills:			
Capital	.....	$5,071,147	*$9,796,104
Products, value	$874,355	$5,186,605	*$18,907,312
Lumber cut, feet	22,104,000	164,663,000	†149,323,000
Mineral Products, value	$2,562,540	$32,988,865	†$369,070,000
Coal mined, tons	1,922,298	2,646,226	3,550,000
Petroleum, barrels	6,472	52,028,718	160,929,000
All Land in Farms, acres	22,988,339	28,859,353	*31,951,934
Improved Land, acres	8,574,187	17,551,337	*18,125,321
Number of Farms	108,000	190,192	*191,988
Value all Farm Property	$277,525,433	$918,198,882	*$1,660,423,544
Value Farm Land	$149,397,900	$649,066,668	*$1,171,459,364
Farm Products, value	$73,120,000	$214,868,112	$430,500,000
Farm Crops, value	$43,760,000	$131,522,000	$278,500,000
Cotton Crop:			
Bales, number	300,000	923,000	620,000
Tobacco Crop, pounds	108,910	50,546	*36,697
Grain Crop:			
Corn, bushels	14,144,000	91,760,000	37,536,000
Wheat, bushels	18,657,000	25,542,000	36,300,000
Oats, bushels	.....	25,514,000	24,000,000
Live Stock:			
Cattle, number	3,209,000	1,954,000	1,709,000
Sheep, number	88,000	62,000	80,000
Swine, number	1,235,000	1,839,000	1,121,000
Horses, number	521,000	743,000	653,000
Mules, number	113,000	257,000	337,000
National Banks:			
Resources	$9,283,028	$81,816,929	$374,404,000
Capital	$2,181,990	$10,692,500	$29,425,000
Deposits	$5,262,842	$45,767,788	$253,634,000
Other Banks, deposits	$3,703,784	$45,735,000	$75,940,000
Railroad Mileage	2,399	5,980	†6,600
Highway Expenditures	**$447,320	††$2,112,681	$14,207,000
Public Schools, expenditures	$686,000	‡‡$3,300,000	†$30,479,000
Assessed Value Property	$99,338,661	$916,417,829	$1,686,188,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

Fifty Years of Progress in South Carolina

By Hon. Thos. G. McLeod, Governor of South Carolina

To scan the progress of South Carolina over a period of fifty years is to read rómance and achievement. Half a century ago a state was prostrate in the wake of Civil War. Its manpower depleted, its field lying idle, the hum of its industries almost silent, South Carolina in 1874, hardly emerged from the abyss of war, faced another crisis. The Reconstruction regime had arisen to sorely try the spirit of a heart-sick people. But the crisis was met, order was restored and then and there the people of a proud state began to make history.

Thos. G. McLeod

A review of South Carolina's progress through the last half-century must be confined to the outstanding features, which themselves are inadequate to describe the strides made in all lines of endeavor.

Textile Industry

The growth of the textile industry in South Carolina has been one of the most remarkable features of the state's development. South Carolina, according to the last report of the Commissioner of Agriculture, Commerce and Industries, "has the unique distinction of being second in the South and third in the United States in the extent and importance of the textile manufacturing industry." In 1923 the total value of the product of the cotton mills of the state was $227,813,000, and the total value of all manufactured products in the state (including textiles) for the year ending December 5, 1923, was $303,650,000.

In 1874 there were less than a dozen textile plants in operation in South Carolina, and these were, on the whole, small mills, utilizing the natural water-powers of their vicinities. Sixteen years later, in 1890, the number had increased to almost thirty. By 1904 the industry had experienced an extraordinary expansion. In 1904 there were 139 cotton mills and other types of textile manufacturing plants in operation.

The average size and value of the individual mill has increased to an extraordinary degree. At the close of 1923 there were 208 mills in operation, with an invested capital of $165,820,520. In 1908 the average capital invested in each mill was $377,440. At the close of 1923 the average was $797,214. In 1908 the value of the product of the mills was $66,971,307; at the close of 1923 it was $227,813,113. Cold figures cannot reveal, however, the humanitarian and social phases of this remarkable growth of the textile industry since the Civil War laid waste this section. Where once poverty, illiteracy and poor living conditions abounded in mill communities, modern educational, humanitarian and social institutions thrive. Mill workers enjoy extraordinary opportunities in every department of their living. Their contentment is attested by the fact that strikes are extremely rare and most harmonious relations exist between employer and employe. The result is that the quality of goods produced and the quantity per worker cannot be improved upon anywhere in the world. This state offers every advantage the textile manufacturer and worker are seeking.

Education

In the field of education South Carolina is making splendid progress. The greatest advancement in education has been made in the past four years. The most interesting and unusual feature of this growth has been the tremendous increase in the number of boys and girls graduating from the high schools. In 1920 there were graduated from the four-year high schools of the state 745 boys and girls, in 1924 2980 boys and girls, an increase of 300 per cent over 1920. In 1920 the state appropriation for the public schools was $931,290, and in 1924 it was $2,919,880.

It is interesting also to note the increase in enrollment in the state's higher institutions of learning. The enrollment of Winthrop College, the state's college for women, has increased from 1100 in 1920 to 1467 in 1924. The University of South Carolina has increased its enrollment from 579 in 1920 to 909 in 1924. These two instances illustrate the continued expansion of all institutions of higher education in the state.

The one-room schoolhouse of half-century ago, the small per cent of boys and girls and young men and women in schools and colleges, the poorly paid teachers and the meager appropriations of that day have long since given way to modern schoolhouses, great enrollments in the schools and colleges, well-paid teachers and increasing appropriations. In 1910, the state appropriated for its higher educational institutions $399,824.25, while in 1924 it appropriated for these same institutions $1,419,915.15. In 1910 $250,000 was appropriated from the state treasury for the public schols, while in 1924 $2,919,880 was appropriated by the state. In 1912-1913 the total expenditures (state, county and school district) for the public schools were $2,247,981, while in 1922-1923 they were $10,034,049. In 1912-1913 there were 180 high schools in the state, with an enrollment of 9339. In 1922-1923 there were 204 high schools, with an enrollment of 22,525. The enrollment of all public schools in the state in 1912-1913 was 167,914, and in 1922-23 it was 236,613. The yearly term of the country schools has increased during this period from 113 to 138 days, and of the town and city schools from 163 to 174 days.

Undoubtedly South Carolina has experienced an educational awakening. Men and women with vision and imbued with the spirit of service are leading the way to a future that shines with promise.

Agriculture

South Carolina has always been one of the leading agricultural Commonwealths of the Union. Recent years have brought forth great advancements in scientific farming and the adoption of modern methods. The invasion of the boll weevil retarded for a time the progress that was being made, but the past two years have seen remarkable recoveries from this setback and diversification has done much toward placing the agricultural life of the state on a firm basis. The co-operative marketing movement has made great headway in the state among both cotton and tobacco farmers. A large, well-equipped Cotton Growers' Co-operative Association is functioning with decided satisfaction. The Tobacco Growers' Co-operative Association is younger, and, while not as large in membership, is growing steadily. Scientific methods in farming are rapidly taking hold throughout the state and great atten-

tion is given to expert leadership, in which Clemson, the South Carolina agricultural and mechanical college, plays a leading part.

South Carolina ranks fifth among the Southern states in the value of all farm crops, and usually ranks third in the number of bales of cotton produced. In citing these figures it is to be remembered that South Carolina, next to Maryland and West Virginia, is the smallest of all the Southern states. In 1909 the value of all farm crops in South Carolina was $137,379,131, and in 1919 the value was $437,121,837. Cotton, corn and tobacco are the leading crops, though the trucking industry is growing rapidly in the state.

In 1910 the value of all farm property was $392,128,314, and in 1920 it was $953,064,742.

Banking

There were twenty-one banks in South Carolina before the Civil War, but only one of them actually survived that conflict. In 1874, therefore, when the state was in the throes of Reconstruction, this bank, with resources totaling $1,000,000, was the only banking house really "on its feet." At the close of 1923 there were 478 banking houses, with resources of $290,624,222. At the close of 1906 the total resources of the state banks of South Carolina were $46,870,821.80, and at the close of 1923 $158,698,222.22. Deposits in state banks at the close of 1906 totaled $17,164,627.82, and at the close of 1923 $63,078,093.60. Savings deposits in the state banks at the close of 1906 totaled $11,888,556.68, and at the close of 1923 the savings deposits at this time being practically as large as the total resources of state banks in 1906. The total resources of national banks in South Carolina as of June 30, 1924, were $131,926,000.

Highways

While South Carolina was ahead in point of time of all states in the construction and operation of a long-distance railroad, the state has been behind many others in improved highways.

Before the era of railroad building commenced in 1830 there were roads, practicable in good weather, connecting the trading points in the state with each other and with adjoining states. Fifty years ago the covered wagons of the mountaineers of North Carolina and Tennessee were common on the streets of Columbia at certain seasons. From the time of the building of the South Carolina Railroad from Charleston to Hamburg near Augusta, Ga.—then the longest railroad in the world—to the period fifty years ago the construction of roads in South Carolina was in the main confined to railroads, and, just after the year 1865, to the reconstruction of many miles of them.

The agitation in South Carolina for good roads started about 15 years ago. A Good Roads Association was organized and improvements were effected in some counties upon the roads in the vicinity of the larger centers. These improvements were sporadic and confined to a few localities. The greatest step toward improved highways was taken in 1917, when the General Assembly established a State Highway Department. By the end of 1919 surveys had been completed in 40 counties and about 645 miles of road as a beginning of the state highway system.

In addition to the Federal-aid work, many of the counties were doing a large amount of road construction with county or township funds.

Since the reorganization of the State Highway Department in 1920 and the imposition of a tax on sales of gasoline in 1922 the work of improving the roads and the building of a connected state system, including the construction of some important bridges, have gone forward at an accelerated rate.

In the last five years there has been an expenditure on the state system for road and bridge construction and for maintenance and betterment of more than $22,000,000, and for the last three years an average yearly expenditure of $5,611,265.

During the first eight months of 1924 the expenditures of the state system have been for construction $2,348,874.77, and for maintenance and betterment $820,171.57.

The total expenditures to September 1, 1924, are therefore increased from $22,031,042 to $25,200,088.

The program for the next 16 years under "the pay as you go" system is for 1800 miles of unpaved road to cost $9,000,000, 2956 miles of paved road for $82,775,000, and for major bridges $6,500,000.

Some Advantages Possessed by the South

Probably few people outside of the South have ever fully realized that a greater diversity of crops can be grown in this section than in any other part of America or of the world, and grown to advantage. Most people outside of the South have thought of this section agriculturally in terms of cotton. The dominant power of the cotton crop in world affairs — industrial, financial and political—has for a hundred years or more concentrated upon cotton apparently almost every thought of people at large in regard to the South, and cotton has to a certain extent dominated the thought of the strictly cotton-growing regions of the South.

In 1894, when there was a disastrous crop failure in the Dakotas and Nebraska, the Manufacturers Record suggested that out of its abundant corn and provision crop a few carloads should be shipped to the starving farmers of the Western states. There was ready response from all parts of the South. As a result of the national attention given to the shipments, Mr. Fitzgerald of Indiana, who had been organizing a Grand Army colony with the idea of settling it somewhere on the Pacific Coast, wrote the Manufacturers Record that never until he read of the shipments of corn had he known that the South produced any corn. He immediately went to Georgia to make an investigation of that state, and instead of going to the Pacific Coast he bought about 100,000 acres in southern Georgia and established the town of Fitzgerald, composed at that time exclusively of Grand Army people.

Mr. Fitzgerald's ignorance about the South's ability to produce corn is merely in keeping with the general ignorance of a vast majority of people in the North and West as to the things the Southern farmer can produce. He can raise cotton with which to clothe the world, sheep for the wool and for the meat, corn and many other things with which to feed hogs, making this the best hog-raising section of the country. He can raise grasses for livestock equal to any to be found in the West, and in many cases superior. He can raise wheat, oats, barley, potatoes (white and sweet), sorghum cane, the widest variety of vegetables and fruits to be found. He can beat the Pacific Coast in apples and every other part of the world in peaches, and as to watermelons nowhere else are they produced in such abundance and with such deliciousness of flavor. From the rivers and from the waters of the Atlantic and the Gulf he can get fish in almost limitless supply, and from many places along the coast an abundant quantity of oysters for home consumption and shipment to the West. He can do all of this in a climate free from the rigors of the North and West, in a climate where blizzards are unknown, where the Government records show that the average health conditions are of the best.

Mineral Resources of South Carolina

By F. H. H. Calhoun, Consulting Geologist, Clemson College, S. C.

South Carolina is pre-eminently an agricultural state. In recent years her towns have experienced a rapid increase in such manufacturing industries as are allied to agriculture, but as a mining state she is not important, producing only 6 per cent of the mineral products of the United States. In 1922 she stood forty-fifth, leading only New Hampshire, Mississippi, District of Columbia, Rhode Island and Delaware. Why is it that South Carolina is deficient in wealth-producing mineral resources when some of her neighbor states are richly endowed?

F. H. H. Calhoun

The presence or absence of mineral resources in a region is the result of its geological history. The four great wealth-producing natural resources—oil, iron, coal and limestone—were accumulated for the most part during the periods of the Paleozoic era. South Carolina has none of these, for the formations of the Paleozoic are entirely lacking in her rock section. Again we ask why this little state was slighted when those fairy gifts were apportioned.

Oil, iron, coal and limestone are among the natural resources which are put down under water, and since these earliest ages the Piedmont section of South Carolina has never been under water. During the Paleozoic a great sea stretched to the west of South Carolina. Here the limestones, which came from sea life, were deposited. Here also conditions were favorable for the accumulation of iron and petroleum. As the outlines of that sea shifted, portions became swamps, where exotic plant and animal life flourished, giving the materials from which coal, oil and natural gas were formed. The present South Carolina was a part of Appalachia, that narrow strip which has the distinction of being the oldest part of North America. And most dearly does she pay for this distinction. The extent of Appalachia varied, but always it included portions of North and South Carolina, Georgia, Virginia and Alabama. While one section and then another of this continent dipped down under the seas for more riches, South Carolina held its mountains high above the waters of the ocean. In the Cretaceous period, while vast swamps in the far west were storing up more wealth, the sea on the east finally crept up as far as what is now called the fall line, but the part of the state then under water was sea rather than swamp, so that the deposits made were marine. This Coastal Plain section has for its rock formations soft shale, sandstone, marl and phosphate rock. The land is flat, still retaining in places the undulatory surface it had when it emerged from the sea.

It is natural to associate the idea of mineral wealth with mountains. Surely those rocky hills of the Piedmont held ores. As a rule, the richer parts of a vein are near the surface. There must have been excessive rains at the time of those extensive seas, so erosion was busy on the land mass during these long geological periods. Rains and streams wore down the high land masses, eroded the cream of what mineral wealth there must have been, carried it down to the seas and deposited it on what was to be South Carolina's neighbor states. Despoiled of the most valuable ores she may have had, she was left with only roots of mountains when the continent finally assumed its present form. So there remained some little pockets of gold, tin and copper, a few scattered deposits of mica, barytes and monozite, and some remnants of a much-folded limestone and dolomite formation.

Although South Carolina is denied the four great wealth-producing natural resources, she does yield stone, clay products, sand, gravel, mica, barytes, marl, phosphate rock and mineral waters. In 1905, her products and their value stood thus:

Value of Minerals, 1905

Clay	$146,790
Clay products	749,835
Gold	95,111
Lime	34,440
Mineral waters	78,837
Monazite	56,574
Phosphate rock	878,169
Stone	297,284
Sand and gravel	5,908
Silver	67
	$2,343,015

It is interesting to note that in 1922 South Carolina produced almost the same total, but the emphasis had been shifted, as shown here:

Value of Minerals, 1922

Barytes and mica	*$16,982
Clay (raw)	416,725
Clay products	*894,513
Gold	32
Mineral waters	21,622
Phosphate rock	8,250
Sand and gravel	297,898
Stone	1,175,049
	$2,831,071

*Estimated.

It will be seen from the foregoing tables that the amount of gold and of phosphate rock mined has declined very materially, while the amount of sand, gravel, clay and stone has increased markedly.

The production of phosphate rock in South Carolina reached its peak in 1908, when $989,881 worth of rock was mined. Since that year there has been a material reduction until in 1921 no rock was mined. In 1922 there was a nominal production. With the discovery of richer and more accessible rock in Florida and Tennessee the phosphate mines of South Carolina cannot hope to resume operation on any scale until the richer rock of these other two Southern states is exhausted.

For 14 years, from 1904 to 1917, the value of clay mined in South Carolina averaged about $150,000 per year. In 1918 there was a jump to $263,000, and in 1920 to $463,000. Since 1917 it has not fallen below $225,000. The kaolins of the state are found chiefly in the lower Cretaceous, which outcrops in a belt from 10 to 30 miles wide, extending from Aiken through Edgefield, Lexing-

ton, Richland and Chesterfield to Marlboro counties. The most important deposits are found in Aiken county, near Langley. There are many beds in this area which vary from 5 to 25 feet in thickness, with overburden varying from nominal to 100 feet. This area affords one of the finest deposits of sedimentary kaolin in the United States. Farther to the northeast, around Sievern, other deposits of good quality occur. There are other beds near Gaston, Congaree, Wedgefield and Garnett. At the present time kaolin is being mined in the vicinity of Langley. Brick clays are found in nearly every county of South Carolina. Large kilns are in operation near Greenwood, Columbia, Camden, Darlington, Sumter and Cheraw. Smaller plants are being operated in other places in the state. The brick at Sumter is a very artistic product, and is frequently specified for buildings in the North and West.

For the 14 years, between 1904 and 1917, the value of stone produced in South Carolina fluctuated between $130,000 and $480,000. Since 1917 there has been a steady increase in the value of stone products, until in 1922 it passed the million-dollar mark. There should be no limit to the amount produced. The state is fortunate in having large deposits of a very fine grade of monumental stone in Fairfield county, near Rion. Here the "Winnsboro Blue" is quarried, and has a wide sale and a well-deserved reputation. Deposits of building stone and stone suitable for crushed rock, rubble, curbing, riprap and other rock for construction work are found at the following points: Trenton, Greenville, Greenwood, Waterloo, Cayce, Beverly, Columbia, Pacolet, Lockhart, Clover and Pageland. The stone quarried in this state is granite and granite gneiss. The few limestone beds are very small and are not advantageously situated for quarrying. There are no sandstone, shales or slates of a quality which would warrant quarrying, and very little rock of the basaltic type occurs within the boundaries of the state.

Between 1904 and 1918 the value of sand and gravel produced in any one year did not exceed $53,000. In 1919 the production jumped to $157,000, and in 1922 it reached the unprecedented amount of $297,898. This increase was due to the extensive building and road-building program in the state.

Some mica, marl, limestone, silver, copper, pyrites, barytes and monazite are occasionally mined, but none of these materials promise any great development. In 1922 mica and barytes were mined at an estimated value of about $17,000. Marl occurs in a few places in the lower part of the state and has been mined for agricultural purposes. Limestone and dolomite occur in the upper part of the state, notably near Gaffney. The deposits are not extensive, however, and have been used only for the manufacture of lime. The production of monazite has practically ceased, due to the opening up of new deposits in Brazil and India. Barytes is mined in Cherokee county, but the amount, though steadily increasing, has been small and relatively unimportant. About 20 years ago cassiterite, a tin oxide, was discovered in this same locality, and since that time other small deposits have been found in the vicinity. Shipments from the Ross mine at Gaffney amounted to 130 tons up to and including 1906. Since that time a few thousand tons of concentrates have been shipped. Much of the first shipments was obtained from placer deposits. Vein mining has apparently met with little success.

Deposits of iron ore are found in Cherokee and adjacent counties. A few deposits of magnetic ore were worked before and during the war, but the ore is too impure to compete with that of the Lake Superior and the Birmingham districts. These iron ores appear to be the result of segregation in a basic igneous intrusion. The magnetite occurs in particles varying in size from fine grains to large boulders. The great difficulty that would be experienced in mining this ore would be the handling of large amounts of gangue. The ore would have to be concentrated by magnetic methods and the expense of smelting so far away from coal fields would be prohibitive. The ore has never been thoroughly prospected and the value of the ore in the deeper portions of the veins is problematical.

During the next decade a constantly increasing demand for raw materials will be made upon the South. There is a ready market for some of the materials which South Carolina produces. Others of her products are used more sparingly, and still others must wait until supplies elsewhere are exhausted or until the local demand becomes great enough to warrant development. South Carolina's future development will be largely in stone, clays, sand, gravel and perhaps phosphate rock. There will be an occasional revival of interest in such minerals as monazite, mica, tin, gold, barytes and copper. But none of these can ever be expected to contribute very largely to South Carolina's mineral wealth. While the state also possesses beds of fuller's earth, they are not as pure or as well qualified to clarify oils as are the Georgia and Florida products, so their future value is problematical. The marl deposits of South Carolina are extensive, especially along the Pee Dee River in the vicinity of Poston, also near Charleston and Eutawville. The overburden is heavy and the calcium carbonate content seldom exceeds 80 per cent. However, the need of lime is great, so that it is possible that old pits may be opened up and new deposits developed. The Eutawville rock is the finest and best located for development of any in the state. Much of this will average over 95 per cent calcium carbonate.

While South Carolina's income from the export of her mineral products will never reach an impressive total, the materials which she now produces are of more value to the state than their monetary value would indicate. Her clays, stones, gravels and sand are vital to her upbuilding. They are located so that they are accessible to all parts of the state, thus cheapening and encouraging her building program.

Mill Managers and Their Employes

When New England capitalists some months ago offered $9,000,000 for the Pelzer Company's mills, representing a capital investment of about $3,000,000, President Smyth, who organized the company 43 years ago, reported to his stockholders that the mills had never shut down. He said that having invited the employes to settle in the mill village it would have been unfair to make them suffer by idleness, and therefore that whether the goods could be sold at the time or not the mills were run for the benefit of the employes. This is only one illustration of hundreds which could be given, showing the relationship between employers and employes. Most of the officials in Southern cotton mills are natives of the South, just as are the employes, and through this has come a mutuality of interests and a close friendship which is found to the same extent in very few industries of any kind in any other part of the country.

Out of the mill operatives have come many of the superintendents and higher officials of Southern mills. There is probably no other class of laborers in the world more thoroughly individualistic and independent than these Southern cotton mill employes.

SOUTH CAROLINA

Total Area, 30,989 Square Miles; Land, 30,495 Square Miles; Water, 494 Square Miles

	1880	1900	1910	1923
Population	995,577	1,340,316	1,515,400	1,744,408
Property, true value	$322,000,000	$485,678,000	¶$1,261,048,000	†$2,404,845,000
Manufactures:				
Capital	$11,205,894	$62,750,027	$173,220,870	*$374,538,000
Products, value	$16,738,008	$53,335,811	$113,235,945	‡$236,421,000
Mines and Quarries:				
Capital	.....	.....	$1,209,390	*$3,205,232
Products, value	.....	.....	$1,252,792	*$1,350,747
Cotton Manufacturing:				
Capital	$2,776,000	$39,259,000	$125,549,000	*$248,327,000
Products, value	$2,896,000	$29,724,000	$65,930,000	*$228,440,000
Spindles, number active	82,334	1,431,349	3,950,800	5,107,038
Looms, number active	1,676	42,663	96,027	114,793
Cotton consumed, pounds	15,601,000	230,054,000	302,627,000	502,051,000
Cottonseed Oil Mills:				
Capital	.....	.....	$6,880,240	*$14,359,320
Products, value	.....	$3,103,425	$10,902,935	*$38,674,794
Lumber cut, feet	185,772,000	466,109,000	706,831,000	†854,799,000
Mineral Products, value	$794,086	$2,451,086	$2,021,371	†$2,414,000
Phosphate mined, tons	190,763	329,173	179,659	*42,709
All Land in Farms, acres	.....	13,985,014	13,512,028	*12,426,675
Improved Land, acres	4,132,050	5,775,741	6,097,999	*6,184,159
Number of Farms	.....	155,355	176,434	*192,693
Value all Farm Property	.....	$153,591,159	$392,128,314	*$953,064,742
Value Farm Land	.....	$99,805,860	$268,774,854	*$647,157,209
Farm Products, value	$41,970,000	$68,267,000	$156,350,420	$313,100,000
Farm Crops, value	.....	$58,890,000	$137,379,000	$275,100,000
Cotton Crop:				
Bales, number	523,000	921,000	1,164,000	795,000
Tobacco Crop, pounds	.....	19,895,970	25,583,049	74,460,000
Grain Crop:				
Corn, bushels	11,746,000	13,129,000	31,580,000	32,670,000
Wheat, bushels	869,000	2,142,000	847,000	1,925,000
Oats, bushels	3,688,000	4,023,000	7,056,000	10,728,000
Live Stock:				
Cattle, number	339,000	343,000	390,000	417,000
Sheep, number	119,000	72,000	38,000	23,000
Swine, number	628,000	619,000	665,000	569,000
Horses, number	61,000	79,000	80,000	70,000
Mules, number	67,000	118,000	155,000	213,000
National Banks:				
Resources	$7,827,603	$11,934,975	$37,326,768	$145,699,000
Capital	$2,451,100	$2,083,000	$5,022,500	$11,980,000
Deposits	$2,586,176	$5,171,643	$18,310,939	$100,346,000
Other Banks, deposits	$658,812	$8,774,786	$35,965,000	$112,059,000
Railroad Mileage	1,427	2,817	3,442	†3,765
Highway Expenditures	.....	**$334,082	††$1,024,480	$8,521,000
Public Schools, expenditures	$324,600	$894,000	‡‡$1,596,000	†$9,568,000
Assessed Value Property	$133,560,135	$176,422,288	$279,755,349	$424,016,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908.

A Study of the Foregoing Figures

It seems difficult to comprehend that in 1880, or fifteen years after the close of the Civil War, the total bank deposits of South Carolina amounted to only $3,244,000, and that even twenty years thereafter, or as late as 1900, the amount was $13,900,000, and that for a state having 1,340,000 population. The poverty indicated by these figures can hardly be understood today when the bank deposits of that state total $212,400,000. In 1860 the assessed value of property in South Carolina was $489,000,000, as compared with $421,000,000 for New Jersey and Rhode Island combined, but in 1870 South Carolina's assessed values had dropped to $183,000,000, while Rhode Island and New Jersey had increased to $868,000,000. That tells the story of what the Civil War and Reconstruction meant to South Carolina. Out of the depths of that poverty South Carolina has advanced since 1900 to its present position as one of the dominating textile centers of the country. In public school expenditures and in other evidences of progress the rate has matched the growth of banking, which is merely a tangible expression of state advancement. The value of the state's crops in 1900 was $58,890,000, and in 1923 $275,000,000. The manufacturing capital in 1880 was $11,205,000, while in 1919, the latest census report, the capital was $374,538,000, and the increase during the last five years has added a good many millions to that amount.

Some Outstanding Facts About Tennessee

By Hon. Austin Peay, Governor of Tennessee

The necessary brevity of this article makes it impossible to touch on more than a few of the outstanding features of Tennessee's unusual resources, characteristics and historical achievements.

Physically, Tennessee presents eight distinct topographical regions, beginning with the lowland along the Mississippi River, less than three hundred feet above the level of the sea, to the top of Unaka Mountains, which are more than 6000 feet above sea level. This diversity of topography has its natural diversity of products, of which there are no fewer than 67 field crops, and an equal diversity in botanical and arborial flora. Tennessee can produce anything and everything except tropical fruits and flowers.

But if the state is rich agriculturally, it is equally so in her mineral resources, such as coal, copper, zinc, iron, cement, clay, marble, phosphate, limestone and barytes, the abundance of which will convince anyone of the unusual wealth of her minerals.

The early pioneers, when they penetrated into the virgin wilderness of what is now the state of Tennessee, were all impressed by its wonderful wealth of forest. Much of this was destroyed to make homes and fields for the tide of immigration which poured into the state. Although today the cultivated area of the state is extensive, the forests of Tennessee contain untold wealth in various hardwoods. Prior to 1907 but little attention had been given to this valuable asset. In that year the Fifty-fifth General Assembly of Tennessee enacted the first general forestry law, which has proved of inestimable benefit in preventing forest fires in this state. Our people have awakened to the importance of preserving their forests, and in the Herbert Domain and in Reelfoot Lake the policy of the state is to set a broad example of conservation. It will be the policy of the state, also, to join with the National Government to renew the forests of the Appalachian region, and it may now be asserted as a fact that Tennessee has entered on a new era of forest growth and preservation.

The University of Tennessee, located at Knoxville, is the crown of the educational system of the state, both in the educational work it has done and its greater plans for the future. It has extended its influence throughout the entire state. The aggregate annual enrollment in various departments is approximately eighteen hundred. In addition, however, to the work in the departments named, there are extension courses in education, trades and industries, boys' and girls' club work, short-time courses in agriculture, home economics, highway engineering, and home demonstration clubs, by means of all of which 32,000 persons are reached annually.

Tennessee maintains four normal schools and one polytechnic institute. A normal school for white teachers is established in each of the three grand divisions of the state. All of them have large enrollments and are doing much to supply the state with teachers of better training. A normal school for negroes is located at Nashville, and is one of the best equipped and efficient schools for negroes in the South. The Tennessee Polytechnic Institute is strictly a vocational school and is located at Cookeville. Besides the high schools of the cities, every county maintains high schools. At present there are 625 high schools in the 95 counties of the state and they have an enrollment of 34,129. They employ 1612 high-school teachers at an average yearly salary of $1152.

In 1923 Tennessee had 6814 elementary schools, employing 13,751 teachers. The scholastic population was 770,500, of whom 654,741 were enrolled. The average daily attendance was 68 per cent of the enrollment. The average length of the school term was 127 days.

Tennessee is making substantial progress in education and standards are gradually being raised. The increased revenues, the better trained teachers, the longer school terms, the better school buildings are evidence of gratifying progress.

As an all-around crop-producing state, Tennessee is not excelled by any other region in the United States in the variety, profusion, character and quality of its farm products. Hon. Homer Hancock, State Commissioner of Agriculture, says:

> "In Tennessee, as in other states, agriculture is our basic industry, the mother of all industries, the root of civilization and human progress, and the only true and sound basis on which to build the prosperity of a state and nation. The food, clothing and shelter essential to man are its gifts and its well-being.
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> "The healthful and delightful climate of Tennessee, combined with the fertile soils and natural grasses, makes possible the profitable production of any and all crops grown in the temporate zone, as well as the wonderful development of all livestock.
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> "The agricultural progress of the state during the past thirty years has been marvelous, easily keeping pace with the development of other industries. In connection with agriculture are the closely allied and rapidly growing industries of livestock, poultry raising and dairying, all capable of much greater expansion. Tennessee stands first in the Union in the production and sale of strawberries, second in beekeeping, and produces great crops of dark and Burley tobacco of unusually fine quality.
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> "Tennessee produces annually approximately: 325,000 bales of cotton; 25,000 bags of peanuts; 78,000,000 bushels of corn; 4,500,000 bushels of wheat; 5,000,000 bushels of oats; 3,000,000 bushels of Irish potatoes; 4,500,000 bushels of sweet potatoes; 1,600,000 tons of hay; 100,000,000 pounds of tobacco; 4,250,000 bushels of apples, and 1,250,000 bushels of peaches.
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> "Tennessee stands third or fourth in number of pure-bred Jersey cattle and is making rapid strides in the development of the dairy industry. Tennessee enjoys an enviable position in the production of early spring lambs for the Eastern markets, produces cattle, sheep, hogs, mules, horses and poultry of superb quality, winning first prizes consistently at the big shows of the nation.
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> "Co-operative marketing has become a permanent slogan of the farmers. Co-operative creameries, co-operative livestock shipping associations, lamb and clubs, strawberry, peanut, cotton, tobacco, peach, truckers', milk and small fruit associations are aiding greatly in the sale and production of farm products."

According to the 1921 Year Book of the United States Department of Agriculture, Tennessee has the following agricultural rank among the Southern states:

First in strawberry acreage (also first in the United States); first in legume hay acreage; second in total value of live stock on farms; second in grass hay acreage; second in number of chickens; second in per acre production of corn; second in number of white owners of farms; third in number of purebred beef cattle; third in per acre production of sweet potatoes; third in number of swine; fourth in production of tobacco; fourth in per acre production of cotton; fourth in average value per farm; fourth in value of vegetables grown for home use, and fifth in percentage of rural population.

Only Oklahoma has fewer acres of land that are unfit for cultivation.

Virginia is the only Southern state with a smaller percentage of tenants and croppers than Tennessee.

In 1923 Tennessee also led all the Southern states in butter output.

In 1910 the capital invested in manufactures in Tennessee was $167,923,784, and according to the census of 1920 was $410,203,000. The value of manufactured products increased from $180,216,548 in 1910 to $556,253,000 in 1919.

Concurrently there was a large increase in the capital, resources and deposits of banks and the assessed valuation of property. Two great factors are largely responsible for the progress in Tennessee's industries, viz., cheap hydro-electric power, of which Tennessee has available 1,020,000 horsepower and proximity to great natural resources.

The United States Department of Commerce reports its preliminary estimate of wealth of the state on December 31, 1922, of as $4,228,251,000, compared with $1,883,698,000 in 1912, an increase of $2,344,553,000, or 124 per cent in that ten-year period.

All classes of property increased in value from 1912 to 1922 except live stock, which declined from $126,175,000 to $115,050,000, or 8.8 per cent. The estimated value of taxed real property and improvements increased from $745,921,000 to $2,246,710,000; exempt real property from $85,993,000 to $252,660,000; farm implements and machinery from $22,504,000 to $42,982,000; manufacturing machinery, tools and implements from $50,650,000 to $145,206,000; railroads and their equipment from $216,745,000 to $269,323,000; privately owned transportation and transmission enterprises, other than railroads, from $118,787,000 to $148,390,000; stocks of goods, vehicles other than motor, furniture and clothing from $477,855,000 to $957,179,000. The value of automobiles in 1922 was $50,734,000, no separate estimate being made for 1912.

These estimates do not include all classes of wealth in Tennessee, for gold and silver coin and bullion, privately owned water-works and other utilities, for example, have been omitted, and furthermore it must be borne in mind that many increases in money are due to increases in prices, and so far as that is the case do not represent corresponding increases in the quantity of wealth.

What Are Tennessee's Mineral Resources?

By Wilbur A. Nelson, State Geologist, Nashville, Tenn.

Tennessee's mineral resources are the basic minerals—iron, aluminum, copper and zinc—which are necessary for the industries of the present age. They are the phosphate and lime deposits for agricultural use. They are our great undeveloped water-powers and coal fields, and, greatest of all, our native Anglo-Saxon population. That such a diversity of natural resources is advantageous is shown by the per capita purchasing power of the citizens of Tennessee, which is $661, according to a statement made by Roger Babson within the last three years. In order to change these minerals from the raw ore into the finished metal it is necessary to have cheap power. Tennessee has these minerals in quantity and likewise is fortunate in having great water-power resources, the most of which are untouched at the present time.

Wilbur A. Nelson

Although our state is likewise rich in agricultural wealth, certain sections of it are not as productive as they could be made with the proper fertilization, and our agricultural wealth would be a thing of the past, only existing in areas of virgin soil or river flood plains, if it were not for the mineral fertilizers which come to the farmer's aid—phosphate, lime and nitrogen, the latter from the air by processes which now appear can be economically developed.

The future of Tennessee and the South depends on the development of all of our resources along all lines. The South is now the great section in America that is undeveloped. It stands in the same relationship to the United States as a whole as the West did at the close of the Civil War. We can pay our indebtedness, both state and national, by increasing our wealth through the same type of development in the South in the coming years as that which took place in the West after the close of the Civil War. There is no section of the country where wealth can be so easily acquired, through the development of our boundless resources, both mineral and agricultural. Such development in Tennessee and the other Southern states can well be made the financial salvation of the country in the next few years as the West was after the Civil War.

A Glimpse of the Past

In the year 1539 De Soto, with an army of 600 Spanish explorers, reached the territory now occupied by East Tennessee after two years' wanderings through the wilderness of America. He had brought to him by one of the Indian chieftains, while he was tarrying in the valley of the Tennessee River near Chattanooga, some small hatchets made of copper, which the Indians reported had come from the mountains to the east. De Soto sent two of his men with guides to search for this deposit, as he hoped that it would contain gold, the metal for which he was searching. His men, however, returned after two days' wandering, stating that their guides had become lost in the high and impassable mountains to the east, and that as it was a very sparsely inhabited country they thought it best to return. Such is our first authentic account, taken from the Diary of De Soto, of one of Tennessee's most important metals, which is now being mined at Ducktown, Tenn.

Perhaps it was good for the people of Tennessee and the South that De Soto did not find any great quantities of the precious metals, gold and silver, but only found quantities of fresh-water pearls, which abound in our Southern streams, and which were not considered of as great value as the precious metals by the ancient Spaniards. For, if the Spaniards had found precious metals in any quantity a permanent Spanish civilization would have been established in this section of our Southern states, and the present South might possibly have been peopled at the present time in a manner similar to parts of Old Mexico. Yet we now know that what we lack in

precious metals is more than made up in metallic and non-metallic minerals, in which Tennessee and the South abound. These are minerals which are the basis of our present civilization.

After De Soto had come and gone this region remained an unbroken wilderness, untraversed by European explorers for over 100 years, and then only one or two hardy explorers traveled up and down the Mississippi Valley region, and little did they publish concerning our natural resources.

It was not until nearly 300 years after De Soto's wanderings in this region that Tennessee became one of the states of the Union. It was only a few years after this that the first continuous geological survey formed by an organized government was started in Tennessee. This survey was organized in 1831 and continued to function until the Civil War in 1861. It was started again at the close of the Civil War and continued for a number of years.

We owe to Dr. Gerard Troost, the first State Geologist of Tennessee, much of our present progress in several lines of mining, for it was he who formed and started the first marble company in east Tennessee, which was the beginning of what is now a great industry. He likewise did considerable work on the zinc ores of east Tennessee, and noted in the year 1838 the presence of zinc in the iron ore at Embreeville. His report on this occurence was undoubtedly overlooked for many years, for the Embree Iron Company, operating at this point, went bankrupt in 1909, not knowing that they had rich zinc ores on their property worth many times more than the iron which they were attempting to melt. They would have known this had they only read Troost's Fifth Report.

Troost must have been a man of great vision to have recognized even at that time the necessity of conservation in a sane way of the great untouched resources of this section. In 1840 he wrote of east Tennessee: "Nature has stamped it as a country for manufacturing as well as for stock raising, and nothing, therefore, is wanted but to furnish it with good roads, and it will soon be covered by industrious laborers. Cooke county, in fact most of the counties in the mountain region, contain their own water-power * * * With such untold power manufactures can be established in these counties, and Nature has at the same time placed raw materials to work upon at the disposal of him who will apply them to useful purposes."

In one of his other reports he urges that the owners of coal property should not be allowed to dig out the most easily removed coal and then abandon the rest to be lost, for he says "it is of the highest importance that this kind of property be placed under proper regulations, which would put it out of the power of the present owners to deprive his successors of the benefits which, under proper management, would accrue to them."

From the time of Troost on through Safford, who followed him as State Geologist, down to the present time, Tennessee has practically had a continuous state survey, although in the latter years of Safford's life the survey was very inactive. The present survey, which was organized in 1910 and has been in charge, respectively, of Geo. H. Ashley, A. H. Purdue and Wilbur A. Nelson, has done much to make possible the first development of water-powers in Tennessee and the establishing of manufacturing plants to use our raw materials.

Our Present Development

If it had not been for the stream-flow records kept by the Government and state on the tributaries of the Tennessee River in east Tennessee, we could not have located on the Little Tennessee River, near Maryville, one of the largest plants in the world for the making of aluminum, an industry which pays into the state each year more revenue in taxes than is appropriated by the state for the entire upkeep and activities of the State Geological Survey.

In the past year two cement plants have been located in Tennessee due to the activities and assistance of the Geological Survey, while a large plant for making artificial whiting and ground limestone was located in the state by the survey about four years ago and has been in successful operation since that time.

The oil development which has taken place in Clay county, Tennessee, has been due almost entirely to the geological work done by the Survey in that region, and indicates that similar development will take place on a larger scale in that section in the coming years.

In the development of our clays the Survey has played an important part. For the past ten years this resource has been extensively advertised. When this work was first started there were no plants in the state manufacturing high-grade china and any of the other high grade articles made from Tennessee ball clay. Now there is in successful operation at Erwin, Tenn., a concern which manufactures the highest grade of chinaware; and last year another large plant was built in Knoxville which is making a full line of high-grade electric porcelain specialties, such as door knobs, tubes, cleats, span wire or guy strand insulators, disc insulators, switch bases, fuse plug porcelain and other pieces of this general character. Our location, from a standpoint of raw materials, for such manufacturing products and for distributing such finished articles is unsurpassed.

Nashville is the greatest self-rising flour district in America, and it was through the assistance of the State Survey that one of the largest plants in the United States for the making of mono-calcium phosphate was established here. In the past great quantities of raw phosphate rock, mined within 40 miles of Nashville in the Mount Pleasant district, were shipped north to Chicago and there made into the phosphate salts used in making self-rising flour, which was then shipped back to Nashville for use by Tennessee in its self-rising flour industry. The Tennessee Survey was instrumental in finding for one of these big chemical companies a sufficient reserve acreage of phospate rock in Tennessee which permitted them to build in Nashville a large plant for making locally the phosphate salt used by the flour trade. Now practically all of the phosphate salt used by the flour trade in Nashville is made in Nashville, and the long haul of the raw material to Chicago and the equally long haul back to Tennessee of the finished materials has been eliminated.

A section which only markets its raw materials can never become commercially great. When the South was first settled the primitive life of the people demanded only the bartering and exchange of cotton, tobacco, sugar, coffee, lumber, furs and skins, and a small amount of machinery and tools; but that period is past. We have made great strides in the direction of converting our raw materials into manufactured articles, but we still have far to go before we will take the place we should occupy in the industrial world. We are at the present time, considering our resources, practically undeveloped. At the close of the Civil War General Wilder built the first pig-iron furnace in east Tennessee, at Rockwood, and declared that he would make iron at a cost of $13 per ton. The leaders of the iron industry in the North said that this was impossible, yet General Wilder went forward with his plans and pig iron was made at Rockwood at a cost as low at $6 per ton.*

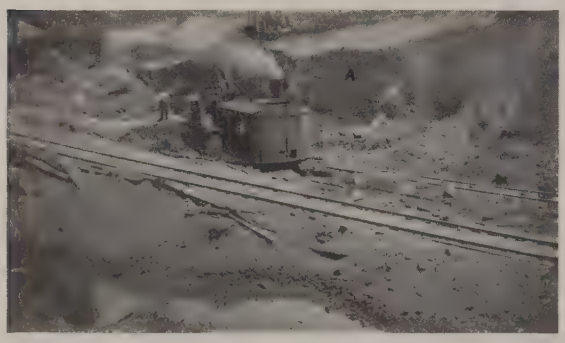
*From address of Lincoln Green, vice-president, Southern Railway; Proceedings of the first annual meeting of the Southern Appalachian Water Power Conference, June, 1922, p. 66, 1922.

When the iron industry started in the South we were satisfied to mine our iron and coal, quarry our limestone, convert these materials into pig iron, and then send that pig iron to other sections of the country for conversion and fabrication into finished high-priced products. At the present time probably 60* per cent of our pig iron produced in the South is melted in the South and converted into all kinds of iron and steel articles. In certain lines we are able to supply entirely our own needs, but in many other lines we are only supplying a part of the South's needs.

In detail Tennessee has the following minerals in quantities worthy of commercial development and use:

Alum.—Alum occurs abundantly in the rockhouses of Tennessee, notably in the counties on the eastern Highland Rim and in those counties along the North Carolina boundary line, particularly in Sevier and Cocke counties. It is, however, doubtful if alum occurs in commercial quantities.

Barite.—Tennessee is one of the leading producers of barite in the United States. It was discovered first in 1840 by Col. R. C. Morris in McMinn county on a road between Mouse Creek and the Hiwassee River. In the year 1873 over 1,000,000 pounds of barite was shipped from Greene, Hamblen and Monroe counties. At the present time most of the barite is mined in Monroe county, and Sweetwater is the center of this industry in the state. During 1924 there has been considerable activity in the Sweetwater district and production has increased.



OPEN-PIT TYPE OF MINING.
A. Barytes Ore. C. Pump House.

Bauxite.—Bauxite occurs in lenticular deposits on the side of Missionary Ridge, just east of Chattanooga, and at Keenburgs, about five miles from Elizabethton, Tenn. Additional deposits of bauxite ore will undoubtedly be found at different points along the entire length of Missionary Ridge, and it is probable that other deposits will be found in east Tennessee between that point and Elizabethton.†

Cement (Portland).—There are many favorable places for locating cement plants both in middle and east Tennessee, as suitable limestones and shales occur in many of the counties in these two sections of the state, and coal can be readily obtained near by. At the present time there are four cement plants in the state—the Dixie Portland Cement Company at Richard City; the Clinchfield Portland Cement Company at Kingsport; the Hermitage Portland Cement Company at Nashville, and the Signal Mountain Portland Cement Company at Chattanooga. These four plants have a total annual output of 3,775,000 barrels of cement a year.

Cement (Natural).—In the past natural cement rock was mined and used at Clifton, Hardin county, Tennessee, and the old reports indicate that this was a good grade of natural cement. The same limestone that was used at these places would probably be found in the adjoining counties.

Old Cement Furnace, Clifton, Tenn.

Chert.—The chert deposits of Tennessee are very widespread and of practically unlimited extent. They are used primarily as road material, but during the recent war a deposit of chert was mined near Iron City and used as flint linings for tube mills. Mines were also located near St. Joseph, Tenn. This flint was shaped at the mines into blocks 5 inches thick, 6 to 14 inches long and 5 to 8 inches wide, and was shipped to the stamp mills of the different mining companies in America and was used by them as a lining for their tube mills.

Clay and Shale.—Practically every county in Tennessee has more or less clay suitable for the making of brick, and the clays of the Tennessee and Cumberland Rivers are particularly suited for making building brick, and large operations in this line are carried on in the outskirts of all of the large cities of Tennessee. The clay deposits of west Tennessee likewise produce a most excellent building brick, and a special shale brick is manufactured in east Tennessee from the shales which occur along the side of the Cumberland Mountains and certain of the east Tennessee ridges.

Certain of the coal seams in the coal fields are underlain by an excellent bed of white plastic clay.

Ball Clay.—The ball clays of Tennessee were described fully in the MANUFACTURERS RECORD.‡ These clays are equal to the famous English clays which for so long have formed the source of supply for America. For a number of years, however, the Tennessee clays have been used extensively in this country and the demand for them is growing more and more each year. The best deposits are located in Henry and Carroll counties, Tennessee. These clays are used in making electric porcelain, porcelain or china, sanitary ware and enamelware, also in the making of pots in which optical glass is melted and in making graphite crucibles.

Flint Clay.—Two flint clay horizons are known to be present in the coal areas in the northeast Tennessee coal field, but the prospecting to date in these areas has not shown this flint clay horizon to contain clay sufficiently thick to work. Additional prospecting would be advisable.

*Some authorities estimate this as high as 80 to 86 per cent.—Ed. Manufacturers Record.

†Nelson, Wilbur A.: "Appalachian Bauxite Deposits," G. S. A., Vol. 34, pp. 525-540, 1923.

‡Nelson, Wilbur A.: Manufacturers Record, issue of February 17, 1921.

Coal.—The coal fields of Tennessee is coincident with the Cumberland Plateau lying in a northeast and southwest direction across the state and a little east of the center. The field has an average width of 35 to 50 miles. There are at least 50 different seams of coal which are known to occur in the state, but with the exception of the northeastern coal field not over two seams are generally workable in any one place. In the northeastern coal field, although there are a number of beds workable in most of this area, in actual practice not over three or four seams are worked in one general locality, as some of the seams lie very high up on the mountain and cover such a small area that their development is not practicable.

The coals of Tennessee are of the bituminous variety and most of them coke, yielding from 48 to 60 per cent. The Sewanee coal is one of the best known coking coals in the state. The Jellico coal has a wide reputation as a very high-grade household or domestic coal.

Copper.—Tennessee copper production comes entirely from the Ducktown basin in the southeast corner of the state, and is produced by only two large mining companies. A third company has recently started operation in this district. The ores occur in a belt two miles wide by 4 miles long, and come from veins a few feet to 150 feet wide, which cut through metamorphic schists. The ore is chiefly pyrrhotite, with a mixture of chalcopyrite. In addition to the copper, these companies also produce a large quantity of sulphuric acid and small amounts of gold and silver.

Left—General View at the Tennessee Copper Co.'s Plant.
Below—Sulphuric Acid Plant at Ducktown, Tenn.

Fluorspar.—Fluorspar occurs in small veins in a number of counties in middle Tennessee, but this state has never been a large producer. From 1902 to 1918 small quantities were mined in Smith, Trousdale and Wilson counties.

Glass Sand.—Glass sand occurs on the Clinch Mountain in east Tennessee.

Gold.—Gold has been found in Monroe county on Coker Creek. It was first discovered here in 1831 and the placer deposits yielded an average of $2 a day. Later, gold-bearing quartz was found on Whip-o-Will branch of Tellico River, and this vein has been worked in the past. It is possible that more gold-bearing quartz veins occur in this section of Tennessee.

Granite.—Large masses of granite of a fairly light color and uniform texture have been found in Carter county, along the east Tennessee and Western North Carolina Railroad, extending from Cranberry to Elizabethton, but no detailed work has ever been done to show just what development could be made of this granite.

Iron.—The iron deposits of this state occur in three belts:

First.—An eastern belt through Johnson, Sullivan, Carter, Washington, Unicoi, Greene, Cocke, Sevier, Blount, Monroe, McMinn and Polk counties, containing limonite, hematite and magnetite. The ores are usually in irregular masses of limited extent, associated with the older rocks and the metamorphosed rocks.

Second.—A belt along the east face of the Cumberland Tablelands and in the Sequatchie Valley. The ore in this case is mainly a red, fossiliferous oolitic hematite ore, known as "Clinton ore." It has been mined extensively in Hamilton, Bradley, James, McMinn, Meigs, Rhea, Roane, Henderson, Campbell, Union, Grainger, Claiborne, Hancock, Marion and Sequatchie counties. The ore occurs as a bedded deposit with much regularity, having a thickness of up to six feet. The leached ore at the surface yields about 56 per cent of iron, though the hard, unweathered ore yields much less.

Third.—The third belt is in western Tennessee, covering an area 50 miles wide, or 5400 square miles. It lies in the counties of Lawrence, Wayne, Hardin, Lewis, Perry, Hickman, Humphreys, Dickson, Houston, Montgomery and Stewart east of the Tennessee River, and Benton and Decatur counties on the west of the Tennessee River. The ores in this belt are limonite, with some hematite and turgite, and occur associated with the chert and clay from the decomposition of the lower Mississippian limestones. These deposits in places have a thickness of up to over one hundred feet. The ore makes up from one-half to one-fourth, or less of the mass.

These ores have never been adequately prospected, but sufficient work has been done to show large quantities of ore. The ore typically occurs as layers in intermingled chert and clay, or as "nests," or large, irregularly shaped masses, or in lumps down to the size of a walnut, usually underlying as overburden of clay, chert or gravel.

Iron making in Tennessee dates from 1790, when a bloomery was built at Embreeville. In 1856 there were 75 forges and bloomeries, 71 furnaces using charcoal, and varying in capacity from 5 to 18 tons a day, and 4 rolling mills. Tennessee is now noted as a maker of specialty iron, as this state produces ferro-phosphorous pig iron,

high-silicon iron, charcoal iron, and low-phosphorous iron from the magnetic iron ores mined at Cranberry, N. C.

Lead.—Lead has been mined extensively in east Tennessee for a number of years, but no large mines have yet been developed. The lead occurs in the form known as galena, and is found in veins mixed with zinc sulphide and barite.

Lime.—Some of the largest lime quarries in the South are located in Tennessee. Very pure oolitic limestones occur on the sides of the Cumberland Mountains, and the marble belt of east Tennessee around Knoxville is also practically pure calcium carbonate. Ideal locations for quarrying exist at a number of places, and large lime plants have been built, which ship their products to all parts of the South.

Limestone Quarry, "Old Hickory," Tenn.

Manganese.—Manganese has been mined intermittently in Tennessee for a number of years, and particularly during the recent war were many mines developed which produced considerable tonnage of this ore. The principal deposits were in east Tennessee, the ore being found in practically every county in that part of the state.

Marble.—Tennessee marble has been well known for a number of years. The quarries are mostly located around Knoxville, Tenn., which city is the center of this industry. Practically all of the commercial output comes from one bed of marble, which is known as the "Holston." A very detailed study was made of all of the marble deposits of east Tennessee and has recently been published by the Tennessee Survey.* The bulk of the marble is used for interior decoration, for which purpose it is highly suited.

Metallic Paint and Mortar.—Many low-grade ores, as well as some of the better grades, are mined for the paint trade. In Tennessee the oxides and carbonates of iron, zinc and lead have been so used.

Oil and Gas.—Tennessee has not yet developed any large oil and gas pools, but in the past two years a new oil field has been developed in Clay county, at Willow Grove. At the present time oil is being produced from Scott, Clay, Fentress and Pickett counties, and additional wells will undoubtedly be brought in in this territory.

Phosphate.—The phosphate deposits of Tennessee have been fully described in the MANUFACTURERS RECORD in a recent issue.† Tennessee phosphate occurs in three forms, known as brown, blue and white rock. The large commercial deposits in the state are the brown rock deposits, which are extensively mined around Mount Pleasant and Centreville. This is one of the largest mining industries of Tennessee, and the state ranks next to Florida in the production of phosphate rock in this country.

Slate.—No slate is at present produced in Tennessee, yet slate occurring in the extreme eastern counties is of an excellent quality. It is a pale green in color and appears very durable. These slate deposits occur in Cocke, Servier, Blount, Monroe, McMinn and Polk counties.

Zinc.—Zinc is one of the major mining industries of the state. The center of operations is at Mascot, where the sulphide ores are extensively mined. A very full description and discussion of the zinc ores has recently been published by the Tennessee Survey.‡

The ore mined is sphalerite, which occurs in an irregular brecciated zone in the dolomites of east Tennessee, and it is probable that other deposits similar to the one at Mascot will be discovered in the future in the eastern part of the state.

WHAT IS OUR FUTURE

To many it may seem that we have progressed rapidly in our Southern development, but when we consider the great manufacturing centers of the North and East one will realize that the South is lagging behind in developing taxable wealth; and although we are proud of the advancement we have made in certain lines, we must see to it that all of our resources are developed and that we go forward in all lines together, so that in a few years we can say that the great increased taxable values of the South, produced through the development of her natural resources, have been the important factor in bringing prosperity to the whole United States.

It is estimated at the present time that there are at least one million and a half undeveloped hydro-electric water-power in Tennessee. The value of this water-power will become greater and greater within the next few years, and we look forward to the development of our natural resources by leaps and bounds within the next decade, particularly in the development of mining and manufacturing industries, based on our ample supply of raw materials. These are a great wealth-producing industries and a source of unestimated wealth. The by-products of many of our industries are now of no value, but in the future may be the basis of rich dividends. In the future many of the articles which are used in the South and which are made out of the raw materials from this section will be manufactured into the finished articles of commerce in Tennessee, and the North will no longer be buying our raw materials and making them into finished articles and shipping them back to us for our consumption with a cost which includes the long railroad haul from the South to the North and back again. Many of our agricultural regions will, due to their great advantages, become industrial valleys, and a transformation will take place in many parts of Tennessee similar to what took place in the valleys of Pennsylvania 50 or 100 years ago.

The Tennessee Survey has just completed a detailed survey of east and middle Tennessee to determine the environmental factors of those sections so that industries can be logically and successfully developed under conditions existing in these two sections of Tennessee. These reports will be published during the coming spring and will give to the manufacturer and financier who is looking for a Southern location information showing what industries could be successfully established in Tennessee.

*Bull. 28, Tennessee Geological Survey.
*"Marble Deposits of East Tennessee." Pt. I, "Occurrence and Distribution," by C. H. Gordon; Pt. II, "Constitution and Adaptations of the Holston Marble," by T. Nelson Dale; Pt. III, "Technology of Marble Quarrying," by Oliver Bowles.

†Smith, Richard W.: "The phosphate rock deposits of South Central Tennessee," Manufacturers Record, August 3, 1922.

‡Bull. No. 31, "Zinc Deposits of East Tennessee," by Mark K. Secrist, 1924.

TENNESSEE

Total Area, 42,022 Square Miles; Land, 41,687 Square Miles; Water, 335 Square Miles

	1880	1900	1910	1923
Population	1,542,359	2,020,616	2,184,789	2,393,077
Property, true value	$705,000,000	$956,672,000	¶$1,883,698,000	†$4,228,251,000
Manufactures:				
Capital	$20,092,845	$63,140,657	$167,923,784	*$410,203,000
Products, value	$37,074,886	$92,749,129	$180,216,548	‡$374,038,000
Mines, Quarries and Wells:				
Capital	.....	.....	$33,819,977	*$51,466,345
Products, value	.....	.....	$12,692,547	*$23,292,114
Cotton Manufacturing:				
Capital	$1,146,000	$3,768,000	$7,454,000	*$21,065,000
Products, value	$875,000	$1,995,000	$5,201,000	*$22,461,000
Spindles, number active	35,736	123,896	250,566	437,168
Looms, number active	818	2,995	4,265	6,076
Cotton consumed, pounds	4,944,000	15,040,000	33,096,000	69,948,000
Cottonseed Oil Mills:				
Capital	.....	.....	$3,730,736	*$12,547,865
Products, value	$1,235,000	$2,980,041	$6,592,776	*$42,258,452
Furniture Manufacturing:				
Products, value	.....	$1,188,000	$3,309,000	*$9,793,000
Pig Iron made, tons	63,279	362,190	397,569	250,982
Coke made, tons	130,609	475,432	322,756	¶¶124,000
Lumber cut, feet	302,673,000	939,463,000	1,016,475,000	†485,979,000
Mineral Products, value	$1,115,000	$8,651,904	$21,396,784	†$35,146,000
Coal mined, tons	495,131	3,509,562	7,121,380	6,100,000
Iron Ore mined, tons	93,272	594,171	732,247	267,275
Petroleum, barrels	.....	.....	.....	8,000
Phosphate mined, tons	.....	454,491	398,188	†300,566
All Land in Farms, acres	.....	20,342,058	20,041,657	*19,510,856
Improved Land, acres	8,496,556	10,245,950	10,890,484	*11,185,302
Number of Farms	.....	224,623	246,012	*252,774
Value all Farm Property	.....	$341,202,025	$612,520,836	*$1,251,964,585
Value Farm Land	.....	$202,013,790	$371,415,783	*$807,782,296
Farm Products, value	$62,076,000	$106,166,000	$192,931,905	$368,800,000
Farm Crops, value	.....	$70,745,000	$111,133,000	$218,500,000
Cotton Crop:				
Bales, number	331,000	327,000	332,000	220,000
Tobacco Crop, pounds	.....	49,157,550	68,756,599	109,500,000
Grain Crop:				
Corn, bushels	62,469,000	56,998,000	88,060,000	73,941,000
Wheat, bushels	7,539,000	11,696,000	8,319,000	4,508,000
Oats, bushels	5,849,000	5,810,000	7,866,000	4,305,000
Live Stock:				
Cattle, number	756,000	912,000	997,000	1,059,000
Sheep, number	673,000	496,000	795,000	326,000
Swine, number	2,160,000	1,977,000	1,388,000	1,373,000
Horses, number	266,000	352,000	350,000	300,000
Mules, number	173,000	254,000	276,000	336,000
National Banks:				
Resources	$13,390,626	$41,213,509	$96,615,971	$229,146,000
Capital	$3,005,300	$7,337,645	$11,895,000	$17,031,000
Deposits	$6,588,048	$22,082,775	$52,080,802	$143,866,000
Other Banks, deposits	$3,222,740	$10,957,562	$41,189,000	$210,036,000
Railroad Mileage	1,843	3,137	3,816	†4,022
Highway Expenditures	.....	**$729,141	††$2,370,560	$15,098,000
Public Schools, expenditures	$744,100	$1,751,000	‡‡$3,187,200	†$15,155,000
Assessed Value Property	$228,154,432	$396,363,566	$500,944,376	$1,650,476,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶By-product coke only; beehive output included in Alabama.

In 1880 the total deposits in all Tennessee banks amounted to a little over $9,800,000, whereas in 1923 the bank deposits of that state were $353,800,000, a growth significant of the progress of the state.

The true value of property in Tennessee in 1880 was $705,000,000. In 1922 it was $4,228,251,000.

In 1880 Tennessee spent upon public school education $744,000, but by 1922 these expenditures had jumped to $15,155,000, or more than twenty times as much.

The capital invested in manufacturing advanced from $20,092,845 in 1880 to $410,203,000 in 1920, $21,065,000 of which was invested in cotton manufacturing in 1920.

Texas

By Hon. Pat M. Neff, Governor of Texas

Fully conscious of, and ever alert to, its own responsibilities in the onward march of enlightened progress throughout the nation in which, socially and industrially, the Southern states are happily forging to the front, Texas, mindful of splendid distances and no less splendid abundance of wealth in natural resources, stands ever ready to do her part, thus vindicating her right to share in the glory of the South's achievement. And, too, with no false conception of economic law, Texans understand that potential wealth is not active wealth; that latent resources are not, in fact, valuable assets until developed; hence they are busily engaged in transforming things which promise to do into things which actually do.

Pat M. Neff

Modestly contending, and ready to prove it, that no state of the American Union may boast of greater economic wealth than Texas, yet mindful of the everlasting truth that, after all, character is the chief asset of every state, Texans realize that while all are *not* born with equal opportunities, yet, in a democracy, every child, whether of the Commonwealth by birth or adoption, inherits from the State in which it lives the right to an equality of opportunity. Imbued with this thought, Texas earnestly and conscientiously is investing no small part of its material wealth in intellectual development. Exclusive of local taxes and considering only the attitude of the state, it may prove interesting to know that fifty-seven and one-fourth (57¼) cents of every state-tax dollar collected is devoted to education.

Each year brings in its wake a new story to tell in agriculture. For the year 1924 Texas cotton yield alone bids fair to exceed four million bales. In view of its climatic and other conditions highly suitable to manufacturing, and its extensive natural-gas fields, greater in area and in volume than found in any other part of the Western Hemisphere; its vast beds of lignite and coal, together with unexcelled possibilities in development of hydro-electric power, it is not imposing upon the credulity of an intelligent people to vision Texas, in the early years to come, as the foremost manufacturing state, and particularly in the manufacture of cotton products.

For the year 1923 the state's agricultural products, including crops and livestock products, attained a value in excess of $1,400,000,000, with that of the year 1924 promising to surpass these figures. And, not to be outdone by any other state, Texas is now developing a "California" of its own; one, too, of no mean proportions. Southwest Texas, more particularly the section lying between the Nueces River and the Rio Grande, an empire in extent, where fruits of the tropics grow side by side with the products of the temperate zones, has during the past few years surprised the whole country, and none more than Texas people themselves, in rapid and successful development of the citrus industry.

Ranches there are and, in parts of Texas, will always be. A few of the million-acre class remain, and with them the picturesque cowboy. However, the majority of the immense cattle ranches of the state have long since yielded to the magic of the plow and the subduing influences of a marching civilization. What that civilization will be when the remaining 60 per cent of the state's tillable soil has been introduced to the plow and taught to give up its sleeping wealth remains for the future and the plow to tell.

It has almost reached the point in Texas when crude oil may be expected to be found nearly everywhere.

With the passing of laws prohibiting livestock from being permitted to run at large, the old line fence is becoming a thing of the past. Not so with post-holes, at least in many instances. One never knows what may have been hiding its presence in these old excavations. It might be traces of sulphur, kaolin, or manganese, or coal, or lignite. They may give out fumes of oil or gas.

Many of the deep-drilled gas wells produce fifty to eighty million cubic feet of gas per twenty-four hours—a superabundance of the cheapest fuel on earth and at the very door of vast fields of raw material. Hooked up with capital and enterprise, such basic wealth will some day write a story of industrial achievement worth reading. Incidentally, crude oil production in Texas for the 1924 fiscal year reached a total value of $132,500,000, while that of sulphur was $8,500,000.

Adding to all this the immense beds of brown hematite iron ore of east Texas, a veritable mountain of rich iron ore in the Llano range, not forgetting the state's tremendous coast line, with adequate harbors, it must not be charged to overconfidence if, with a clear understanding of all that a generous Providence has contributed in basic resources and a fair knowledge of the spirit of the people of Texas, we see in the dawning light of an immediate future an era of economic development in Texas that will, of its own force, write a most wonderful chapter in the history of the South's educational, agricultural and industrial development.

Immense Area of Texas

The size of Texas may probably be more clearly appreciated by the following statement: If one will take a geographically correct map of Texas and stick a pin through the center, and put it over Nashville, Tenn., the eastern end of Texas will reach to Raleigh, the western to Little Rock, the northern end to Chicago and the southern to the Gulf of Mexico. It is true that the state is not square and not all of the section reached by these projecting points of Texas would be covered as with a solid block. Nevertheless, the illustration gives one an idea of the immensity of this state, whose resources are commensurate with its area.

The total area of Texas is 265,896 square miles, of which the land area comprises 262,398 square miles and water 3498 square miles. The total farm land area of Texas amounts to over 178,000 square miles. Texas is 53,000 square miles larger than France, 83,000 square miles larger than Germany and 144,000 square miles larger than the United Kingdom. Texas' farm area is nearly equal to the total area of Germany.

Nature seems to have planned Texas, and so richly endowed it with resources of soil and climate and minerals, that it is well-nigh impossible to venture any forecast as to its development in the future without creating the impression of wild optimism, but none but those who have made a personal study of Texas can have any conception of what the future may bring forth in this vast domain.

Mineral Resources of Texas*

By E. H. Sellards, Chief Geologist, Bureau of Economic Geology, University of Texas, Austin, Tex.

Nature has been in many ways very generous to Texas, particularly in her gift of abundant and varied mineral resources. At the present time the mineral production in Texas has a value in excess of $200,000,000. However, the present output, although large, by no means represents the possibilities of the state. On the contrary, it is small as compared to the output that will certainly follow adequate exploration and development. Something of the possibilities of mineral production in this richly endowed state is indicated briefly in the following:

E. H. Sellards

Petroleum

From the small beginnings of about thirty years ago the petroleum industry of Texas has advanced and enlarged by successive new discoveries until it has become the leading mineral industry, the production of oil in the state in 1923 being over 131,000,000 barrels. The principal areas of the state that yield petroleum, or afford possibilities of production, include the Gulf Coastal belt, the Inner Coastal belt, the Pennsylvanian and the Permian regions. In the Gulf Coastal belt are found the salt dome oil fields. The intensity of production in places within this area is illustrated by the Spindletop dome, where between forty-five and fifty million barrels of oil have been taken from an area not exceeding 200 acres in extent. At least eighteen of these salt domes have been found productive of oil within the Texas Coastal belt. A second important oil-producing region lies along the inner margin of the Coastal Plain, in which is found the old Corsicana pool and the new Powell field, as well as the Luling, Mexia and numerous other smaller fields. A third region is the great Pennsylvanian area of north-central Texas, in which numerous fields have been developed from the Colorado River on the south to the Red River at the north. The newest producing region in this state is the great Permian series of west Texas, the possibilities of which are indicated by present-day developments in Potter, Mitchell and Reagan counties.

Much of Texas, more perhaps than is included in the regions referred to, awaits further exploration of its petroleum resources. No one can say when the peak of production will be reached. To what extent new discoveries in petroleum represent the unexpected may be seen by a review of the discovery of some of the Texas fields. In 1901 the Spindletop pool was discovered, this pool representing the first salt dome production in the state. In 1917 wells in Eastland county, passing through the producing horizons known at that time, obtained deeper production, thus opening up the great storehouse from the Bend series of north Texas. In a similar way deep drilling at Mexia in 1920 discovered production in the Woodbine formation, previously assumed to be non-productive in that part of Texas. In 1922 another surprise came in the discovery of a producing horizon within the Lower Cretaceous in the Edwards formation at Luling. Production from the Permian underlying the salt beds of west Texas represents still another recently discovered horizon. The oldest oil field of commercial importance in the state is the Corsicana field, in which production began about 1895; the largest field to be recently discovered is the Powell field, located about eight miles east of Corsicana and within the limits of the old Corsicana-Powell developments. It is a wise man indeed who can say just when the last new field has been discovered, even in the oldest territory.

Natural Gas

Among the principal gas fields in Texas are the Electra field in Clay county and numerous smaller fields in the north-central Texas oil-producing region. Very large gas wells have been obtained near Amarillo in northwest Texas, the gas coming from the Permian formations. In the Gulf region gas has been obtained at various localities from the Gulf Coast to the inner margin of the Coastal Plain. The gas resources of the state are evidently capable of a very large future development.

Coal and Lignite

In its fuel resources Texas is fortunate in having, in addition to oil and gas, both coal and lignite. These include the bituminous coal of the Pennsylvanian and Cretaceous and the lignite and cannel coal of the Tertiary. The value of coal and lignite now produced in the state is between five and six million dollars annually. The Pennsylvanian coals are found in the north-central part of the state in a belt of country extending from the Colorado River in a northeasterly direction to the Red River. The coal of this area, which is good quality bituminous coal, is found in veins averaging from twenty-eight to thirty inches in thickness. The Cretaceous bituminous coal is found in the southwestern part of the state near Eagle Pass, and has been mined both in Texas and in Mexico. The coal veins as developed in Texas vary in thickness from three to seven feet, with an average thickness of four or five feet. Some Cretaceous coal is found also farther to the west in Brewster and Presidio counties. Coal of this western area has been but little developed.

Lignite deposits are found in Texas in a broad belt extending from the Red River in the northeastern corner of the state in a southwesterly direction 600 miles to the Rio Grande. The width of this lignite belt is variable, but in places exceeds 100 miles. Within this large area there are numerous beds of lignite, each being more or less local in extent. In practical development the extent of each particular lignite bed is to be worked out for the locality under consideration. The cannel coal deposits known in Texas lie near the Mexican border in Webb county, and include probably the largest body of cannel coal of bituminous grade in the United States. This coal is hard, low in moisture, black and glossy in appearance and affords the unusual guarantee for Tertiary coal of 12,500 B. T. U. The extent of the coal deposits is yet to be determined.

Potash

Among the undeveloped resources of Texas are its potash deposits, a mineral indispensable as a fertilizer. Potash has been found to be present in the great Permian salt beds of west Texas, and has been observed at places

* Published by permission of the Director, Bureau of Economic Geology, University of Texas.

in these deposits over an area extending in a north-south direction as much as 300 miles. The potash thus far found has been obtained largely incidental to wells drilled as tests for oil. Under these conditions little is known as yet as to the thickness and extent of individual potash beds. However, the frequent occurrence of potash in the salt deposits of this large area affords very encouraging indications of potash deposits of commercial value, and it is not too much to expect a potash industry as a future development of the west Texas region. In addition to the potash in the salt beds, this mineral is present also in solution in numerous alkali lakes of the High Plains region. The potash of these lakes has not yet been extracted in Texas. The utilization of the potash so necessary to agriculture awaits future development.

Salt

Salt is found in very large quantities in the salt domes of the Gulf Coastal Plains of Texas and Louisiana and likewise in the bedded Permian deposits of west Texas. The salt domes are in no small degree a geologic puzzle, and at the present time there is much that is unaccounted for in these peculiar structural features. Nothing like them is found elsewhere in the United States, although their counterpart exists in some of the countries of the Eastern Hemisphere and in Central America. A salt dome is a mass or plug of salt projecting up into or through the underlying formations. In some of these domes the salt core rises to or very near the surface, and under these conditions may dissolve, forming a depression. Other domes in which the salt core fails to reach the surface are sometimes represented by an actual dome-like elevation on the ground. In addition to the salt domes near the Gulf, similar domes are found near the inner margin of the Coastal Plain. It is from these inland salt domes that salt is being produced in Texas at the present time. Among the domes of this type are Grand Saline in Van Zandt county, Palestine Saline in Anderson county and Steen and Brook's Salines in Smith county.

The salt of the Permian formations of west Texas was formerly worked to some extent. In case of the future development of potash, suggested in the preceding paragraph, the salt beds will also be developed. The salt now produced in Texas approximates $750,000 annually in value. The state, however, is capable of affording practically unlimited quantities of salt.

Sulphur

Both in its manner of occurrence and in the methods of mining, the sulphur deposits of Texas are of special interest. The salt domes, referred to in the preceding paragraphs, contain, in addition to salt, in many instances large deposits of sulphur, and it is from these domes, both in Louisiana and in Texas, that most of the sulphur that has been produced for commerce in the United States has been taken. The method of mining this mineral is unique. Superheated steam is conducted into the earth through pipes, thus melting the sulphur. This melted sulphur is then pumped out and is allowed to cool in large reservoirs. In this way huge quantities of sulphur are brought to the surface and stored for use as occasion demands.

In addition to the sulphur of the salt domes of the Coastal Plains, some sulphur has been found in Culberson and in Reeves counties. These deposits, although formerly worked to some extent, are not being operated at present.

Gypsum

The gypsum deposits in Texas are found in the Permian formations of west Texas. These formations, previously referred to in connection with the discussion of salt and potash, are found in a belt of country extending through west Texas from the Red River to the Pecos River. The quantity of gypsum in these formations is practically unlimited.

Fuller's Earth

Fuller's earth is a clay which has the property of absorbing basic colors and removing these from solution in animal, vegetable and mineral oils, as well as from water and certain other liquids. In commerce, this earth finds its chief use in clarifying oils, although it has in addition a number of minor uses, among which are the removal of the excess of coloring from water in dyeing cloth, as an ingredient in talcum powders, as a detergent in fulling cloth, and to some extent for medicinal purposes. Fuller's earth is used also in the preparation of a reagent, known as Lloyd's reagent for alkaloids. This reagent, used for the removal of alkaloids from the aqueous solution of their salts, is more efficient than charcoal or freshly precipitated aluminum, which has heretofore been chiefly used for that purpose.

Fuller's earth, like other clays, is complex and consists not of a single mineral, but of a variety of minerals, the mineral particles being mixed in different earths in widely differing proportions, resulting in a varying chemical and mineralogical composition.

Fuller's earth is produced at present in one Texas county and is known to occur in two or three other counties.

Stone

The principal stone resources of Texas include granite, marble, limestone and sandstone. The granites of the Central Mineral Region of Texas are notable for the variety which they present. This region contains granites for all purposes for which granites are used and in inexhaustible quantity. Marble has been found and quarried to some extent in the Central Mineral Region. Other marbles are found in Culberson, Presidio, El Paso and Brewster counties. Limestone-bearing formations are widely distributed in the state, and the amount of limestone produced and used for various purposes, chiefly as building stone, is difficult to estimate. The quality of many of these limestones is such as to justify much more extensive use than has heretofore been made of them. Sandstones are more or less used in various parts of the state. Near Barstow in Ward county a red sandstone is quarried, which has been extensively used for trimming stone and brick buildings.

Clay

The clays of Texas are extensively distributed. Those now being utilized are for the most part in the thickly settled sections of the state. The clays of the Pennsylvanian formations of north-central Texas have proven desirable for making brick, tile, sewer pipe and stoneware. Some of these clays found in association with the coal beds have produced a desirable fire brick. In association with lignite deposits in the Tertiary formations are found clays of a grade suitable for building brick. With the progressive development of the state the clay resources may be expected to increase proportionately.

Lime and Cement

In view of the abundance of limestone in Texas it is apparent that lime for building purposes will always be abundantly supplied. At the present time the limestones mostly used for this purpose are those of the Cretaceous formations, locations for lime-kilns being selected near

transportation and within reach of the thickly settled areas of the state. The lime production in Texas at the present time approximates $500,000 per annum, but is capable of unlimited increase as occasion demands.

As in the case of lime, the location of cement plants is selected with regard to transportation and accessibility to markets. The extensive beds of limestone in the state are available for cement manufacture as the demand increases. The cement manufactured in the state at the present is between two and three million barrels annually.

Road Materials

The road-building materials of Texas include crushed stone of various kinds, gravel and sand-clay, as well as manufactured materials, such as cement and paving brick. A valuable road material now much used, found in Uvalde and Kinney counties in southwest Texas, consists of asphalt-impregnated limestone. The asphalt has thoroughly penetrated the pores of this limestone, which was originally a porous rock. On crushing and applying to roads the asphalt in the limestone forms a binder, resulting in a road much superior to roads built of limestone alone. The demand for this rock is increasing rapidly, and the quantity available is such as to meet the demands for a long period of time.

Iron

Iron ore, chiefly limonite and carbonate, is found somewhat extensively distributed in the Tertiary formations of the northeastern part of the state. It occurs as laminated and as nodular deposits as well as in conglomerate masses. Since the iron ore is hard and resistant to wear, it is commonly found at the present time capping the top of hills. The metallic content of these ores averages from 30 to 35 per cent. These ores have been worked to some extent, although no mines are operated at the present time.

Silver

Silver has been produced in Texas from at least five counties, namely, Brewster, Culberson, El Paso, Hudspeth and Presidio. The greater part of the production, however, is from the Shafter district in Presidio county, where the silver ore is found filling cavities and crevices in Permian limestones. The principal ore is in the form of silver chloride, although some of the silver is associated with galena. At the Hazel Mine in Culberson county the silver ore is found in veins in Cambrian sandstones.

Quicksilver

Quicksilver in Texas is obtained from mines located in Brewster county. The mineral is very largely cinnibar, a sulphide of mercury, also known as natural vermillion. The ore is found in dikes and fissures which cut through the Cretaceous formations. In these deposits there has been observed by Udden a relationship between structural features and quicksilver deposits. Thus the richest deposits are found in domes, anticlines or terraces, in this respect resembling the accumulation of oil and gas in similar structures. Aside from the structural feature, accumulation is affected likewise by variations in the character of the rocks. Thus the mercury minerals accumulate in limestone at the point of contact with overlying shales or other impervious rock. The deposit of mercury ore is not confined to any one formation, but is found in successive formations where the conditions are favorable to accumulation, particularly at the contact of limestone with shale. The veins in which the mineral is found are frequently fault planes, representing breaks and displacements of the rocks. The production of quicksilver began in Texas in 1900, and in 1918 reached the production of 36,482 tons of ore, yielding 8451 flasks of mercury, valued at a little less than $1,000,000.

Copper, Gold, Lead, Molybdenum and Zinc

The minerals copper, gold, lead, molybdenum, tin and zinc have been produced only in very limited quantities in Texas. A number of them, however, are somewhat widely distributed. Copper is found in the Hazel mine in Culberson county, where it is associated with silver. Copper is also found in several counties of northwest Texas, where it occurs as native copper in the Permian formations. Copper in this form has been reported from Clay, Archer, Haskell, Wichita, Baylor, Taylor, Ford, Knox and perhaps other counties, and has in the past been mined to some extent.

Gold has been produced only in very limited quantities and chiefly as a by-product, although in Llano county gold was for a time mined.

Molybdenum has been reported from some localities in Llano county. Zinc has been found in limited quantities in El Paso, Presidio and Culberson counties. Tin was at one time mined from the Franklin Mountains, about twelve miles north of El Paso.

Miscellaneous Minerals

The minerals occurring in Texas not utilized at present and mined only in a small way are numerous. The following brief note relates to some of these as yet but little developed minerals:

Graphite is found in Llano, Mason and Gillespie counties of the Central Mineral Region, where it is being mined to some extent. It is found in the formation known as the Pack Saddle Schist, and is said to exist in this formation in large quantities.

Other minerals found in the same formation include talc and serpentine, neither of which, however, is at present produced in commercial quantities. Mica is found to be present in various formations in the state, and has been mined to some extent in the Van Horn Mountains in Culberson county. Rare earth minerals, valuable because of their property of becoming incandescent upon being heated, have been mined to some extent in the Central Mineral Region.

This summary of Texas' mineral resources, brief as it is, nevertheless indicates that the state has a wealth of mineral resources, as yet untouched, awaiting intelligent development.

Texas' Quicksilver Possibilities

Brewster county, Texas, is claimed to offer the opportunity to develop for the Southwest one of the largest producing quicksilver fields in America. Texas was once second to California in quicksilver production. Since 1890 production of quicksilver in the United States has been about 30,000 flasks a year short of the country's consumption.

Perfecting of the mercury boiler in connection with the decreasing production of quicksilver in past years indicates a possible revival of interest in the quicksilver industry and sources of supply.

Facts on Texas' Growth

The true value of its property in 1922, according to the census report, was $9,850,000,000, or more than ten times as great as the value of 1880, and over four times

the value of all property reported for 1900. The increase since 1912 was $3,471,200,000, or about $1,150,000,000 more than the total wealth of the state 22 years ago.

In 1880 the total deposits in all of its banks were $8,412,000. In 1923 they were $815,000,000.

In the same period the value of its farm products jumped from $65,204,000 to $1,400,000,000.

Its cotton crop in the same period advanced from 805,000 bales to 4,290,000 bales, and that state now produces on the average about one-third of the total crop of the United States. Its corn crop increased from 66,755,000 bushels in 1880 to 96,440,000 bushels in 1923. Texas produced 3,008,000 bushels of wheat in 1880 and in 1923 16,370,000 bushels. The oats production of Texas in 1880 was 6,937,000 bushels; in 1923, 47,040,000 bushels.

The state spent a little over $1,000,000 on public schools in 1880 and over $52,000,000 was spent for public schools in 1922.

TEXAS

Total Area, 265,896 Square Miles; Land, 262,398 Square Miles; Water, 3,498 Square Miles

	1880	1900	1910	1923
Population	1,591,749	3,048,710	3,896,542	4,939,630
Property, true value	$825,000,000	$2,322,152,000	*$6,379,592,000	†$9,850,888,000
Manufactures:				
Capital	$9,245,561	$63,655,616	$216,875,579	*$585,776,000
Products, value	$20,719,928	$92,894,433	$272,895,635	‡$842,438,000
Mines, Quarries and Wells:				
Capital	.....	.....	$19,575,969	*$361,684,392
Products, value	.....	.....	$10,742,150	*$160,378,158
Cotton Manufacturing:				
Capital	.....	$2,227,000	$4,283,000	*$10,188,000
Products, value	.....	$1,200,000	$2,815,000	*$13,920,000
Spindles, number active	2,648	48,756	90,010	175,104
Looms, number active	71	1,018	2,445	5,185
Cotton consumed, pounds	120,000	9,304,000	14,128,000	50,746,000
Cottonseed Oil Mills:				
Capital	.....	.....	$21,506,347	*$45,780,010
Products, value	$276,450	$14,005,324	$29,915,772	*$102,111,850
Furniture Manufacturing:				
Products, value	.....	$185,000	$1,512,000	*$4,394,000
Pig Iron made, tons	2,232	10,150	.....	¶¶
Lumber cut, feet	328,968,000	1,230,904,000	1,884,134,000	†1,542,708,000
Mineral Products, value	$134,640	$5,295,753	$18,383,451	†$249,604,000
Coal mined, tons	.....	968,373	1,892,176	1,100,000
Iron Ore mined, tons	3,214	16,881	29,535	.....
Petroleum, barrels	.....	836,039	8,899,266	131,023,000
All Land in Farms, acres	.....	125,807,017	112,435,067	*114,020,621
Improved Land, acres	12,650,314	19,576,076	27,360,666	*31,227,503
Number of Farms	.....	352,190	417,770	*436,033
Value all Farm Property	.....	$962,476,273	$2,218,645,164	*$4,447,420,321
Value Farm Land	.....	$591,550,802	$1,633,207,135	*$3,245,208,649
Farm Products, value	$65,204,000	$239,823,000	$430,005,899	$1,400,700,000
Farm Crops, value	.....	$166,965,000	$287,455,000	$1,119,000,000
Cotton Crop:				
Bales, number	805,000	2,186,000	3,049,000	4,290,000
Tobacco Crop, pounds	.....	550,120	161,533	*27,067
Grain Crop:				
Corn, bushels	66,755,000	81,962,000	140,080,000	96,440,000
Wheat, bushels	3,008,000	23,396,000	10,500,000	16,370,000
Oats, bushels	6,937,000	28,278,000	24,080,000	47,040,000
Live Stock:				
Cattle, number	3,994,000	9,428,000	6,935,000	6,660,000
Sheep, number	3,651,000	1,889,000	1,809,000	3,091,000
Swine, number	1,950,000	2,666,000	2,336,000	1,904,000
Horses, number	806,000	1,270,000	1,170,000	980,000
Mules, number	132,000	507,000	676,000	854,000
National Banks:				
Resources	$5,021,016	$97,763,442	$333,999,904	$933,962,000
Capital	$1,420,000	$19,618,920	$44,206,000	$73,240,000
Deposits	$2,080,993	$49,749,108	$175,959,283	$571,240,000
Other Banks, deposits	$6,332,751	***$2,934,634	$43,533,000	$244,082,000
Railroad Mileage	3,244	9,886	14,282	†16,151
Highway Expenditures	.....	**$2,543,613	††$9,920,079	$35,106,000
Public Schools, expenditures	$1,030,000	$4,465,200	‡‡$9,511,200	†$52,452,000
Assessed Value Property	$320,364,515	$914,007,634	$2,394,265,292	$3,400,000,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Included with West Virginia. ***Excluding State Banks.

Virginia's Resources

By Hon. E. Lee Trinkle, Governor of Virginia

Blessed with marvelous wealth in resources, with abounding fertility and occupying a central position between the tiers of Northern and Southern states, the miraculous recovery and giant strides made by Virginia since the War Between the States have been such as to challenge the admiration of the entire country. From the standpoint of mineral and coal deposits, agricultural activity and diversification, as well as in the world of business and in the realm of finance, the Mother of States has taken and maintained a leading role. In her capital at Richmond is located one of the regional banks. In her construction of state highways, as in education, she is enthusiastically aggressive. Virginia possesses one of the greatest harbors in the world. Her coal deposits are sufficient in themselves to run the nation. In agriculture she has long been a leader.

E. Lee Trinkle

The value of manufactured products in Virginia increased from $108,600,000 in 1900 to $650,000,000 in 1920. The annual lumber cut exceeds 1,000,000,000 feet. The total value of mineral mined, according to 1920 statistics, was $82,662,945, representing an increase in value over 1919 of 40 per cent. The production of iron ores in 1920 amounted to 320,109 long tons, valued at $1,227,601. The value of pig iron produced for the same year was $16,086,946. Virginia ranks among the principal coal-producing states in the Union. In 1920 she produced 11,378,606 short tons, valued at $45,446,465. The production of coke for the same year was 714,980 short tons, valued at $6,324,578. Seven trunk-line railroads intersect and penetrate the state, these being the Chesapeake & Ohio, The Virginian, the Norfolk & Western, the Richmond, Fredericksburg & Potomac, the Seaboard Air Line, the Atlantic Coast Line and the main line of the Southern. Hampton Roads, the finest gateway to the Seven Seas, is the second port in the nation. The total value of foreign trade through Hampton Roads for the year ending June 30, 1920, was $236,296,204, and for the fiscal year ending June 30, 1921, $335,567,481. The port has attained first rank as a tobacco export point, the movement of this commodity having shown an increase of nearly 2000 per cent in the last four years. The 1921 movement amounted to 207,713,172 pounds, valued at $135,195,363.

Agriculture

According to reports issued from the Federal Department of Agriculture, Virginia grows a larger percentage of crops for home and farm consumption than any other state in the Union. She is the largest producer of early potatoes; the largest shipper of sweet potatoes; she ranked second in production of peanuts in 1923, and she is the third largest producer of tobacco. Washington and New York are the only states which surpass her in the production of commercial apples. Virginia ships nearly one-half of the commercial spinach crop, she produced more cotton per acre in 1923 than any other state, and, while cotton was grown in only twelve counties, the 1923 crop was valued at $8,000,000. Virginia possesses more purebred horses, sheep, beef and dairy cattle than any other South Atlantic state. She ranks third in the number of farmers pledged to the use of purebred sires, losing second place to Kentucky but recently. She leads all South Atlantic states in milk production. Virginia was the fifth state to introduce the marketing of farm products as an official activity. She was among the first in co-operative marketing. The Eastern Shore Produce Exchange is the oldest successful co-operative marketing association in the East. This association has contributed greatly to the upbuilding of the counties of Accomac and Northampton, which are said to be the richest counties in the United States. The Tobacco Growers' Co-operative Association has the largest membership of any commodity organization.

State Highways

The State Highway system of Virginia has a total mileage of approximately 4400 miles, and is laid out to take care of the traffic between the leading cities and to connect, either directly or by spur, all the county-seats of the state. Approximately 1800 miles have been constructed, 1300 by the state at a cost of $22,000,000, 40 by the Federal Government, and about 460 by the counties previous to being taken over by the state. At the present time there are under construction 514 miles, of which 320 are of hard surface, 194 grading, sand-clay or gravel, of which 68 are being constructed by the state's own forces, leaving a balance yet to be improved of approximately 2100 miles, while the greater portion of the 460 miles will have to be resurfaced and widened. There is a secondary or state-aid system consisting of approximately 12,000 miles, of which 6000 miles have been constructed, the state paying 50 per cent of the cost. This and the auxiliary system of district roads make up the entire mileage of the state. The state and state-aid systems will accommodate and serve at least 90 per cent of the traffic. The automobile license fee provides sufficient funds (in addition to construction funds) to maintain the entire state highway system, making it suitable for travel practically throughout the entire year.

Educational Expansion

In the last thirteen years Virginia has increased state educational appropriations from $1,645,000 to $5,218,000, county appropriations from $644,000 to $2,593,000, district appropriations from $781,915 to $4,086,000, cities from $964,643 to $5,961,000. During this same period the cost of instruction has increased from $2,800,000 to $11,809,000, valuation of school property from $8,535,000 to $39,083,000, vocational education from $70,283 in 1910 to $243,507 in 1923. During the thirteen-year period noted the school population, age 7 to 20, increased but 74,756, while school enrollment increased 160,889. One-teacher schools decreased 1678 or more than one-third. The average salary of all public school teachers, including both white and colored, increased from $268 to $727.52, or nearly 250 per cent. Per capita cost of education increased from $10.67 to $39.27, or almost 300 per cent. School terms increased from 140 to 158 days. The number of teachers from 10,443 to 15,401. The number of teachers with higher than first-grade certificates increased from 2820 to 8835. The great gain has been in the last three

years. For instance, the increase in receipts for public schools from 1910 to 1920 was $8,964,000, while from 1920 to 1923 it was $9,676,000, making a total increase for the thirteen-year period of more than $18,600,000.

Virginia's Growth in Banking

The story of Virginia's growth in banking during the last fifty years (1874-1924) begins with the background that was less than ten years after the War Between the States and the origin of the National Banking system. That war ruined practically all the state banks. There are today but two left which had a pre-war existence. No national bank as such antedated that period. There are no figures extant showing the totals of state banks in 1874, but it is probable that they compared favorably with the national banks, and that the combined total resources were around $25,000,000. A condensed statement of the national banks as of June 26, 1874, in even thousands, follows:

Resources

Loans and discounts, securities, etc.	$10,269,000
Banking-house, furniture and fixtures and other real estate	432,000
Cash, exchange and due from banks	2,315,000
Other assets	310,000
	$13,326,000

Liabilities

Capital, surplus and undivided profits	$ 4,583,000
Circulation	2,838,000
Deposits and due banks	5,821,000
Bills payable and rediscounts	84,000
	$13,326,000

A condensed statement of all banks in the state other than private banks June 30, 1924, is as follows:

Resources

Loans and discounts, securities, etc.	$435,876,000
Banking-house, furniture and fixtures and other real estate	19,413,000
Cash, exchange and due from banks	56,709,000
Other assets	14,535,000
	$526,533,000

Liabilities

Capital, surplus and undivided profits	$ 96,058,000
Circulation	20,588,000
Deposits and due banks	363,212,000
Bills payable and rediscounts	30,971,000
Other liabilities	15,704,000
	$526,533,000

Of these totals about 55 per cent represent national banks and 45 per cent state banks.

The Mineral Resources of Virginia

By Thomas L. Watson, State Geologist, Charlottesville, Va.

Possessed of a great variety of mineral resources, which afford the basis of a varied and extensive mining industry, Virginia ranks as one of the most important mining states in the South. Mildness of climate, which permits of mining and quarrying operations throughout the year; ample supply of labor, with freedom from labor troubles, such as strikes, etc.; abundant lines of railway, which insure ample transportation facilities, and innumerable streams, which afford an ample water supply for mining operations, are factors conducive to the increasing development of Virginia's abundant and varied mineral resources.

Thomas L. Watson

Virginia's location on the Atlantic slope, being halfway between the North and South, makes all points within the state readily accessible to the principal cities and markets of the East. Its unexcelled harbor facilities in the matchless Hampton Roads afford unparalleled conditions for export and import shipping, and its lines of railway insure ready communication with points West.

Being so greatly favored by advantages of location and transportation facilities, and with abundant supplies of unexcelled coal for steaming and coking purposes, of limestone for fluxing and other purposes, of timber for mining operations, and of ample labor, Virginia becomes a most inviting field for the development of mining industries.

Historical

Of the great variety of mineral resources found within the state, some have been worked since early colonial days, especially coal, iron ores and brick clays.

The first coal mined in the United States was in the Richmond Basin, where mines were opened and worked on the James River near Richmond as early as 1750. Mining of coal near Richmond has continued at intervals down to the present day. Opening of the extensive coal fields in southwest Virginia, which gives the state rank among the important coal-producing states, is of very much more recent date.

Likewise the first iron ore mined in America was in Virginia, in 1609, by the Jamestown colonists, and iron works were erected on Falling Creek near Richmond between the years 1619 and 1622, but these were destroyed in the Indian massacre of 1622 before they had been operated. It was in Virginia, however, that Governor Spotswood established the first iron industry in the South, when two furnaces were built in Spotsylvania county—the Germania or Rappahannock in 1714 and a second one near Frederickville in 1724. The Accokeek Creek furnace was built at the same time in Stafford county, on the land of Augustine Washington, the father of George Washington. Old's furnace near Charlottesville was another of the pre-Revolutionary furnaces built in Virginia, and between the years 1760 and 1761 six additional furnaces were built in the state, three being located west and three east of the Blue Ridge. With only one exception, however, the furnace located at Reusens, near Lynchburg, all the iron furnaces in Virginia are located at present west of the Blue Ridge.

The first lead mining in Virginia dates back about 175 years, when the old lead mines at Austinville, on New River, in Wythe county, were worked. Colonel Chiswell, a native of Wales, commenced operations at Austinville in 1750 and continued about 25 years, closing shortly after

the beginning of the Revolutionary War in 1776. These mines have been extensively developed and are now worked for zinc.

Mining of other ores in Virginia, most of which continue at the present time, post-date by many years in most cases the very early period of mining of those briefly sketched above.

Production

About forty mineral substances have been or are now exploited, many of them on a large scale, which give to the state prominence in a varied and extensive mining industry. Those that have been mined and quarried in Virginia are: Iron ores, manganese ores, gold, silver, copper, lead, zinc and tin ores, coal, clay, sand and gravel, stone (granite, marble, limestone, sandstone, slate, etc.), abrasives (millstones and emery), silica (quartz, chert, diatomaceous earth, etc.), mica, feldspar, asbestos, talc and soapstone, barytes, gypsum, salt, mineral paint (ocher), marl (greensand and calcareous), pyrite and pyrrhotite, arsenic (arsenopyrite), phosphate, graphite, titanium minerals (rutile and ilmenite), mineral waters, etc.

There is given in the following tabular statement the annual value of the mineral production of Virginia (including kinds of mineral substances mined and quarried) for the years 1913 and 1917-1923, The years given have been selected chiefly for comparative purposes to show the condition of the mining industry in Virginia prior to (1914), during (1917-1918) and subsequent to (1919-1923) the World War. Probably there is available no better index to the status of the mining industry of a state than detailed and accurate statistics of annual production of the mines and quarries, such as those given and collected co-operatively by the State and Federal surveys.

Comparing the total figures of production for the three periods shown, a marked increase in value of mineral production in Virginia during the European War and since, over that of the period preceding, is indicated. The maximum total value ($85,444,569) was reached in 1920, dropped to less than one-half for 1921, and with marked increase over 1921 for the year 1923, amounting in 1923 to $59,319,705. The table further shows that Virginia produces annually a large variety of mineral products which are widely distributed over the state, and are capable of much greater expansion with increased demand for the products of the mines and quarries.

During the past several years the mining industry throughout the United States, including Virginia, has been greatly depressed, but has already begun to revive, as

Value of the Mineral Production of Virginia, 1913-1923

Commodity	1913	1917	1918	1919	1920	1921	1923
Barytes	(a)	(a)	(a)	$34,737	(a)	(a)	(a) †
Clay products	$1,720,102	$1,664,305	$1,699,777	2,778,383	$3,467,105	$2,656,613	$3,923,859†
Coal	8,952,653	20,125,713	25,865,895	23,774,941	45,446,465	22,947,700	32,468,000
Coke	2,840,275	5,785,934	8,046,115	5,391,367	9,106,202	2,029,652	5,107,190
Copper	8,724	10,000	.....	.....	.....	.....	.....
Gems and precious stones	30	2,677	(a)	.....	(a)	.....	.....
Gold	604	1,343	400	.....	.....	763	.....
Granite	462,162	307,224	336,696	189,564	148,300	175,812	157,987
Iron ore	983,279	1,182,449	1,365,582	1,139,349	1,227,601	196,935	664,240
Iron, pig	5,310,167	15,703,295	15,430,473	9,094,135	16,086,946	2,023,268	6,389,149
Lead	71,808	147,794	115,683	.....	.....	.....	.....
Lime	805,443	1,820,446	1,629,567	1,805,627	2,201,724	1,005,677	1,490,306
Limestone	598,032	1,263,284	1,230,412	1,454,989	1,545,253	1,308,246	2,220,462
Manganese and manganiferous ore	40,480	774,774	628,061	185,491	73,929	15,549	45,705
Marl	.....	.....	(a)	176,780	143,373	105,821	87,714
Mica	5,150	25,540	50,480	(a)	65,500	(a)	14,695
Millstones, chasers, etc.	23,530	18,980	(a)	(a)	34,676	(a)	(a)
Mineral waters	298,473	237,788	173,912	143,199	147,600	122,283	104,680
Pyrite	587,041	1,378,043	841,177	891,308	(a)	(a)	(a)
Sand and gravel	239,591	532,310	764,618	1,349,148	1,133,279	958,527	1,665,439
Sandstone	(a)	34,058	47,309	28,654	77,448	(a)	27,724
Silver	580	3,723	1,814	.....	.....	8	.....
Slate	175,830	135,380	109,723	200,282	251,055	212,943	419,704
Talc and soapstone	615,558	489,062	597,782	(a)	729,767	601,878	960,628
Titanium minerals:							
Ilmenite	.....	6,576	11,100	2,120	(a)	.....	9,320
Rutile	49,000	32,960	39,150	20,400	(a)	.....	81,000
Zinc	304,528	347,352	173,081	.....	.....	.....	.....
Miscellaneous	1,528,616*	1,733,369¶	2,269,774‡‡	2,923,654**	3,558,346¶¶	2,606,337††	3,481,903‡
Total	$25,621,656	$53,764,379	$61,428,581	$51,584,128	$85,444,569	$36,968,012	$59,319,705‡

a Included under "Miscellaneous."

* Includes barytes, briquets (fuel), cement, emery, gypsum, infusorial earth, manganiferous ore, marble, metallic paint, ocher, salt, sandstone and zinc oxide.

¶ Includes asbestos, barytes, briquets (fuel), cement, emery, gypsum, marble, peat, quartz (silica) and salt.

‡‡ Includes barytes, briquets (fuel), cement, diatomaceous earth, emery, gems and precious stones, gypsum, marble, marl (calcareous), millstones, chasers, etc., quartz (silica), salt, stone and zinc oxide.

** Includes basalt, cement, emery, gypsum, mica, millstones, etc., salt, talc and soapstone, and zinc oxide.

¶¶ Includes barytes, basalt, cement, emery, gems and precious stones, gypsum, ilmenite, pyrite, rutile, salt, and lead and zinc pigments.

†† Includes barytes, basalt, cement, coke screenings, diatomaceous earth, emery, gypsum, mica, millstones, pyrite, salt, sandstone and silver.

† United States Bureau of the Census, Department of Commerce.

‡ Includes barytes, basalt, clay (fire and miscellaneous), cement, emery, feldspar, gypsum, kaolin, marble, millstones, pyrites, salt brine and stone (miscellaneous.)

shown in the foregoing table, for the year 1923. This general depression of the mineral industry was the chief cause for the lower figures of value of Virginia's production for the years 1921 and 1922.

Review of the Mining Industry in Virginia

Due to lack of space, some of the more salient features only of the industry can be indicated. Attention should be directed to the fact that of Virginia's abundant and varied mineral resources some are developed, others are undergoing development, while others still await development. These are widely distributed over the state and are capable of greater expansion. Other mineral substances known to occur in Virginia, but not yet developed, are under investigation by the State Geological Survey, and should add materially to the present mineral production of the state in the near future. Development of some of these is now in progress, and production should begin shortly.

Coal—This represents much the largest single mineral substance developed in the state. Three important regions in Virginia contribute to the total production, namely: (1) the Pennsylvanian coal measures, which include the counties of Tazewell, Buchanan, Dickenson, Russell, Lee, Wise and Scott, yield the major production of the state, and give to Virginia rank among the important coal-producing states. (2) The Valley coal fields of Mississippian age, comprising chiefly the counties of Montgomery, Pulaski, Wythe and Bland. This is the only important commercial region of hard coals in the country that can compete with the anthracite coals of Pennsylvania. Much importance attaches to these fields, and at present there is considerable activity, with an encouraging outlook for the future. (3) The Richmond Coal Basin of Triassic rocks, which lies a short distance west of Richmond, and is the most important area of coal immediately adjacent to tidewater on the Atlantic slope. Recent detailed surveys, including mapping of the first region mentioned above by the State and Federal surveys, comprising about 1550 square miles, show the total amount of ultimately available coal to be 28,148,782,000 tons. Based on the assumption of 70 per cent recovery, the total figures are 20,006,000,000 tons of coal. The coals produce an excellent grade of coke, and among them are some of the best steaming coals in the world, especially the famous Pocahontas coal.

Iron Ores—Iron-ore mining in the state showed a remarkable decrease for the years 1921 and 1922 over preceding years, but with a noteworthy increase for the year 1923. The striking decrease in production for the years 1921-1922 was due to commercial conditions that obtained during those years in the iron industry throughout the country. These conditions were reflected in the pig-iron production in Virginia during the same period. In 1920 the pig-iron production in the state was valued at $16,086,946, dropped in 1922 to the low value of $793,903, but increased in 1923 to a total value of $6,389,149.

Stone—A variety of rock is quarried in Virginia and used for all purposes made of such stone, both as dimension blocks, crushed rock, etc. The rocks quarried for the various uses made of them include granite, limestone, marble, sandstone, slate, basalt, etc., of which there are unlimited supplies. Due to labor conditions during the late war, the quarrying industry fell below normal during that period, but has since shown a steady increase.

Sand and Gravel—Sands for all uses, especially for building, molding and glass making, have extensive development in the state, with increasing production. Attention is especially directed to the occurrence of important commercial deposits of foundry or molding sands in the Coastal Plain province of Virginia and of extensive deposits of glass sands in many parts of the state.

Talc and Soapstone—Soapstone of commercial grade occurs in many of the Piedmont uplands counties, and is actively quarried in a number. Virginia ranks first among the domestic producers, and the product, which has a variety of uses, is shipped to many foreign countries.

Abrasives—Among the numerous mineral substances that have been or are worked in the state for use as abrasives, mention should be made especially of the large emery-bearing area in Pittsylvania county, which began producing during the World War and has yielded to date a large total tonnage. The Virginia area ranks next to the Peekskill area in New York state.

Titanium Minerals—The production of rutile and ilmenite, used chiefly in alloys, the ceramic industry and as chemical salts in the tanning and dyeing industries, is an important industry in Virginia.

Metalliferous Materials.—These include gold and silver, copper, lead and zinc, all of which have been mined or are being mined at the present time. Important developments are in progress in a part of the zinc-bearing region of southwest Virginia with most encouraging results. Likewise attention is again being attracted to the gold-bearing belt of the Piedmont uplands, which has been an important producer in the past.

Miscellaneous.—Under this head may be tabulated, among the more important mineral products that are worked and which contribute in a substantial way to the state's revenue, gypsum, salt brine, manganese and manganiferous ores, cement, barytes, feldspar, diatomaceous earth, etc. The formerly extensively worked pyrite deposits of Louisa, Prince William and Stafford counties are idle because of the serious competition of sulphur from Louisiana and Texas. "American sulphur has displaced pyrite to so great an extent that less than one-fourth of the pre-war quantity of pyrites is now being imported." The Virginia pyrite deposits are among the most extensive in this country and have given the state first rank among the domestic producing states.

Other mineral substances which have not yet produced are under development, and we are encouraged in the belief that they will shortly be added to the permanent list of producers.

Death of Dr. Thomas L. Watson

The foregoing article by Dr. Watson was probably the last contribution he ever made to any publication on the mineral resources of Virginia. He had long held the position of State Geologist of Virginia and professor of geology in the University of Virginia, and was ever an enthusiastic worker for the welfare of the state.

Two of the contributors to this issue, Dr. Watson and Secretary Wallace of the Department of Agriculture, passed away within a few days after their manuscript was received. Their last contributions—the one about Virginia, the other about the agriculture of the South—were written in response to our request in order to help make known the things which they felt would be of help to Virginia and to the whole South.

They were men of high ideals, with a sense of duty to the positions which they held before the public to render every service possible to their country. Though for each of them this life has ended, their good works live on.

VIRGINIA

Total Area, 42,627 Square Miles; Land, 40,262 Square Miles; Water, 2,365 Square Miles

	1880	1900	1910	1923
Population	1,512,565	1,854,184	2,061,612	2,398,441
Property, true value	$707,000,000	$1,102,310,000	¶$2,402,412,000	†$4,891,570,000
Manufactures:				
Capital	$26,968,990	$92,299,589	$216,392,388	*$463,644,000
Products, value	$51,780,992	$108,644,150	$219,793,858	‡$454,261,000
Mines and Quarries:				
Capital	.....	.....	$55,992,693	*$57,035,775
Products, value	.....	.....	$8,795,646	*$29,363,449
Cotton Manufacturing:				
Capital	$1,190,000	$4,403,000	$14,070,000	*$33,732,000
Products, value	$1,041,000	$2,655,000	$7,490,000	*$32,535,000
Spindles, number active	44,340	126,827	358,536	654,785
Looms, number active	1,322	4,608	10,770	18,691
Cotton consumed, pounds	5,088,000	17,833,000	34,699,000	85,501,000
Furniture Manufacturing:				
Products, value	.....	$213,000	$1,438,000	*$5,043,000
Pig Iron made, tons	.....	490,617	444,976	276,874
Coke made, tons	.....	685,156	1,493,655	721,000
Lumber cut, feet	315,939,000	956,169,000	1,652,192,000	†617,493,000
Mineral Products, value	$1,263,039	$5,658,801	$18,224,987	†$38,551,000
Coal mined, tons	43,079	2,393,754	6,507,997	11,000,000
Iron Ore mined, tons	217,448	¶¶921,821	¶¶903,377	155,977
All Lands in Farms, acres	.....	19,907,883	19,495,636	*18,561,112
Improved Land, acres	8,510,113	10,094,805	9,870,058	*9,460,492
Number of Farms	.....	167,886	184,018	*186,242
Value all Farm Property	.....	$323,515,977	$625,065,383	*$1,196,555,772
Value Farm Land	.....	$200,615,080	$394,658,912	*$756,354,277
Farm Products, value	$45,726,000	$86,549,000	$150,872,046	$301,900,000
Farm Crops, value	.....	$58,702,000	$89,775,000	$195,600,000
Cotton Crop:				
Bales, number	19,000	10,000	15,000	50,000
Tobacco Crop, pounds	.....	122,884,900	132,979,390	150,960,000
Grain Crop:				
Corn, bushels	45,230,000	28,183,000	49,980,000	53,563,000
Wheat, bushels	8,737,000	9,422,000	9,574,000	11,145,000
Oats, bushels	5,775,000	5,168,000	4,356,000	3,586,000
Live Stock:				
Cattle, number	631,000	826,000	859,000	886,000
Sheep, number	497,000	693,000	805,000	355,000
Swine, number	956,000	946,000	798,000	655,000
Horses, number	219,000	299,000	330,000	288,000
Mules, number	34,000	48,000	60,000	97,000
National Banks:				
Resources	$14,348,362	$39,058,368	$132,766,631	$403,395,000
Capital	$3,066,000	$5,171,000	$15,743,500	$29,704,000
Deposits	$6,690,447	$20,473,458	$73,652,398	$248,268,000
Other Banks, deposits	$7,757,202	$22,451,581	$50,753,000	$155,716,000
Railroad Mileage	1,893	3,779	4,535	†4,695
Highway Expenditures	.....	**$687,751	††$3,224,529	$16,148,000
Public Schools, expenditures	$946,100	$1,989,200	‡‡$3,634,600	†$21,213,000
Assessed Value Property	$318,331,441	$480,425,025	$775,000,000	$1,889,305,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Includes West Virginia.

In the early days of its history, even prior to the Revolution, and for some years thereafter, Virginia gave relatively great attention to industrial interests. It has made much progress in that line since 1880, when the capital invested in manufacturing was $26,968,000, as compared with $463,644,000 in 1920. But Virginia has not yet begun to reap the full benefit of its resources in raw materials and its advantages for location in its manufacturing progress. Its expansion in the future should be in keeping with its great advantages. It has raw materials for many lines of manufacturing. It has one of the world's greatest harbors, and on it one of the world's greatest shipyards. At this harbor vast shipping facilities have been provided for the handling of coal, making of Hampton Roads one of the greatest coal handling centers of the world. But as in manufacturing, so in shipping—what has been done is only suggestive of the limitless possibilities of what may be done.

In 1880, when Virginia was in the depths of poverty, following the Civil War, it expended only $946,100 upon public school education, but in 1922 the figures had leaped to $21,213,000.

The value of its farm property rose from $323,000,000 in 1900 to $1,196,000,000 in 1920.

West Virginia

By Hon. E. F. Morgan, Governor of West Virginia

In 1860 the population of that portion of Virginia now known as West Virginia was 376,688. In 1870, the first census taken after West Virginia was admitted to statehood, the population was 442,014, which increased to 618,457 in 1880, 958,800 in 1900, 1,221,119 in 1910 and to 1,463,701 in 1920.

From 1860 to 1900, a period of forty years, the population of West Virginia increased 582,112. From 1900 to 1920, a period of twenty years, the population of the state increased 504,901.

E. F. Morgan

The census of 1920 gave West Virginia a population of 1,463,701 persons, of whom 1,377,235 are white, 86,345 are negroes and the remainder divided among the other races. The increase in population in the state during the last decennial period was 19.9 per cent, and only thirteen of the forty-eight states showed a greater per cent of increase.

In the matter of social justice to those who labor, West Virginia has a record of which she is exceedingly proud. In 1920, according to the census reports, there were 1,083,305 persons in West Virginia over ten years of age, and of this number 45.3 per cent were engaged in useful occupations. The average of those employed in vocations of that age and over in the nation was 50.3 per cent. In the United States 78.2 per cent of the males and 21.1 per cent of the females over ten years of age are employed in gainful occupations. In West Virginia 76 per cent of the males and 11.2 of the females are so employed. In the nation 23.7 per cent of the women over 15 years of age are employed in gainful occupation; while in West Virginia only 13.1 per cent of the female population of that age is so employed.

This record is lower than that of any other state in the Union. While West Virginia is one of thirteen states that have child labor laws equal to the standards imposed by the Federal Government, we feel in West Virginia that the record made is not due so much to the inhibition of child labor as it is to the opportunities found in the state for a family to maintain itself without imposing on childhood.

Coal is the greatest resource of West Virginia. It is a commodity that is known as the most vital factor in the life of any nation. As a basic necessity it is the most indispensable commodity of modern industrial life. It is the source of power. No nation has achieved lasting supremacy without an adequate supply of coal. There is no permanency or stability to industrial life without it.

West Virginia has more extensive coal deposits of high-quality coal than any other of the forty-eight states. The state has a coal area of more than 17,000 square miles, in the heart of the Appalachian coal field, and the smokeless coals produced in the state are rated as the highest quality steaming coals in the world. Geologists estimate that there are 1,600,000,000 tons of coal stored in the hills and mountains of West Virginia.

West Virginia in 1874 produced 1,120,000 tons of coal. Twenty years later, in 1894, the annual production had increased to 11,627,757 tons. In 1923 the annual production of coal in West Virginia reached the high record of 107,900,000 tons.

The beginning of the oil and gas industry in West Virginia was established during the years 1805 to 1808, when pioneers drilling for salt brines encountered natural gas in the Kanawha Valley. They invented casings, drilling tools and a considerable per cent of the material paraphernalia used in the present day for the drilling of oil and natural gas. Natural gas, however, was not discovered in any great quantity until 1841 in this same Valley, and it was used as a fuel in the evaporation of salt brines. In 1860 the first oil well was drilled in West Virginia, and intermittent drilling was continued until in the early nineties. In 1900 the oil industry in West Virginia reached its peak, with an annual production of 16,195,000 barrels. In 1876 the oil production was 120,000 barrels annually, and for the past calendar year it was approximately 7,000,000 barrels. The total production since West Virginia became interested in the production of oil is over 325,000,000 barrels.

The production of natural gas did not reach its peak until 1917, when 309,000,000,000 cubic feet of gas was extracted from the earth. The estimated production of natural gas from 1885 to 1905 is 2,391,000,000,000 cubic feet. Geologists estimate that the production of oil and gas will continue until the latter part of the present century.

Agriculture is the oldest industry in the state. For more than two hundred years some of the farms in West Virginia have been cultivated. West Virginia is primarily a state of small farms, the census showing in 1920 that there were 87,289 farms in the state, of which approximately 50,000 were of 100 acres. The census also shows that of the farms in West Virginia 98.6 per cent are operated by native white farmers, while the average for the United States is 76.3 per cent.

The total number of acres in West Virginia is 15,374,080, and of this total 9,569,790 acres are included in the farm area. The total value of the West Virginia farm property in 1920 was $496,439,000, and the total value of farm products $140,700,000. In recent years the West Virginia farmer has realized the necessity for the growth of diversified crops. Considering rainfall, temperature and soils, the state is naturally adapted to the growing of a diversity of crops. The average rainfall in the state is about 45 inches, and this is sufficient for the production of crops in every farming area of the state.

The lowest altitude in the state is at Harpers Ferry, on the eastern boundary, where the elevation is 260 feet, and the highest point is Spruce Knob, in Pendleton county, where the elevation is 4780 feet. The wide variance in the altitude of the several sections gives a difference in temperature that enables those engaged in agricultural pursuits to produce a wide and varied number of crops. It is well known that crops which could not be produced in states farther north, because of early chilling frosts, and those which cannot be produced in states farther south, because of excessive heat, can be grown in abundance in West Virginia.

There is in West Virginia an area of bluegrass in different sections equal to that of any other state, and with the copious streams of pure crystal water that flow from our mountains the livestock industry is a profitable one that gives promise of a more remarkable growth. The winters

are mild and open, and in some of the counties cattle graze nine months of the year and herds are carried through the winter on hay alone, although cereal crops can and are grown in abundant quantities.

West Virginia is one of the richest states of the Union in the number and quality of medicinal properties found in the waters that flow from her mineral springs. Some of these springs were discovered by pioneers in the days before the Revolutionary War, and even before that period the Indians used them when they were afflicted with diseases that are common among those who live today.

This state being a veritable storehouse of energy and power, has made substantial growth in manufacturing in recent years.

From 1899 the number of manufacturing establishments increased in West Virginia from 1824 to approximately 3000; the number of persons engaged in manufacturing increased from 33,000 to more than 100,000; the capital invested in manufacturing increased from $49,000,000 to $339,000,000; the salaries and wages paid to employes from $14,000,000 to $119,000,000, and the value of manufactured products from $67,000,000 to $500,000,000.

In 1870 there were only 387 miles of railroad in the state; in 1924 there are 4000 miles of railroad. The seven largest railroads operating within the state have a total valuation for taxable purposes of $229,000,000 in a total of the $250,000,000 assessment against all the railway companies in the state. These seven railroads employ 37,000 people and pay annual wages of $54,000,000.

The growth of the railroads is primarily responsible for the development of the state. As the railroad penetrated the forest area mills were started, towns established and industry developed. Fifty years ago nearly 10,000,000 acres of the area in West Virginia were in virgin forest, while today this area of original forest will not exceed a half million acres.

According to the figures of the United States Geological Survey, the Southern states produced in 1920 9,640,000,000 kilowatt hours of electric power. West Virginia led this division in electrical production for that year. The total kilowatt hour output in West Virginia was 1,351,000,000, being 480,000,000 greater than Missouri, her nearest competitor. It is estimated that the streams of West Virginia are capable of producing 1,250,000 horsepower. The development of hydro-electric energy in West Virginia is now in the infant stages, but work has already begun in the New and Cheat rivers, the two streams capable of producing the largest quantity of electrical energy.

In 1891 the total deposits in 23 national banks and 49 state banks then operating in the state aggregated $14,000,000. In 1923 the combined deposits of 125 national banks and 222 state banks amounted to $343,000,000.

In the last thirty years the program of education is rivalved only by industrial development. In the current year approximately 50 per cent of the revenues collected by the state and subsidiary political divisions is expended for education. From 1890 to 1923 the number of schools increased from 4814 to 7480; the number of teachers from 5491 to 13,477; the enrollment of school youth from 193.000 to 395,000; the disbursements from the teachers' fund from $832,000 to $12,916,000 and the value of public school property from $2,483,000 to $33,000,000; the number of high schools from 63 to 211, and the number of volumes in school libraries from 5000 to 607,000.

In 1920 the voters of West Virginia removed from the State Constitution an inhibition against the state creating a bonded indebtedness, and substituted therefor a provision that will enable the legislature to issue bonds to a maximum amount of $50,000,000 for the building of an intercounty system of hard-surfaced roads. The legislatures of 1921 and 1923 have provided for the issuance of bonds to the amount of $30,000,000. A comprehensive road program was developed by the legislature of 1921, and there has been designated by a State Road Commission 3600 miles of state roads for permanent improvement. Of this total more than 2000 miles have been improved or are under contract for improvement at this time. The Commission also built, or has let contracts for building, 350 bridges, involving an expenditure of approximately $2,500,000.

The construction of these permanent highways is the most progressive, economic step taken in West Virginia since her admission to statehood. The completion of this state-wide system not only means an outlet to the markets for agricultural products, but will give to visitors ingress and egress to a state which abounds in natural wonders and picturesque scenery.

To the present time these expenditures of the state for permanent highway improvements have not cost a single penny in direct taxation on the property of the state. The State Road Commission has maintained its administrative program; maintains a sinking fund created for the retirement of bonds, and pays the interest on the bonds with the revenue derived from license tax on vehicles and the tax imposed on the sale of gasoline. The total amount of revenue derived from these two sources approximates $4,000,000 annually.

Glowing Tributes to the South

THE LETTER from President Coolidge, the articles by Secretary Hoover and other officials of the Federal Government, the letters from business men of the highest standing—all painting a glowing picture of the future of the South—will be of untold and untellable value to this section. They will concentrate upon the South the thought of the entire country. Upon this section will be focused the study as a field for investment and upbuilding work of all the business forces of all sections of the land. They will inspire the people of the South who might have been tempted to move to other sections to stay at home and with a spirit of enthusiasm and optimism dedicate their lives to the upbuilding of their own country.

Particularly may they be an active force for the awakening of the young people of the South to the opportunities surrounding them at home.

The Blue Book of Southern Progress

WHILE THE SOUTH'S DEVELOPMENT is the largest publication ever issued by the MANUFACTURERS RECORD, indeed we believe the largest newspaper ever published in this country, it is only suggestive or indicative of the character of work which in one way or another the MANUFACTURERS RECORD has been doing for forty-two years. Its annual "Blue Book of Southern Progress," a standard reference work on the South, is yearly distributed by banks and business men of the Southern states to thousands of their correspondents throughout the United States, and is used by bankers and others as a standard handbook or encyclopedia of statistical information about the South.

The 1925 edition, which will be issued next spring, should be in every business office, in every public and private library in the South, and in every office in other sections where any information about the South is desired.

The Natural Resources of West Virginia

By I. C. White, State Geologist, Morgantown, W. Va.

Those who seek gold, silver, copper, tin, lead and other costly metals should waste no time in West Virginia. Traces she may have of all, but none in commercial quantity. Volcanic disturbances, great faults, quartz veins and extensive metamorphism of sedimentary rocks which always accompany the rare metals are comparatively unknown within her borders. But while precious stones, gems and metals have been denied the Little Mountain State, yet generous nature has so richly dowered her with common minerals and with other common things that her natural wealth is unsurpassed by any equal area on the continent. These are some of her riches: A genial climate, midway between the extremes of heat and cold, with an average rainfall of forty-five inches, well distributed throughout the year, giving abundant moisture for crops, as well as ample water supply for the numerous streams and rivers; a fertile soil, yielding abundant returns to agriculture, grazing, horticulture, and unsurpassed for apples, peaches, pears, cherries and all of the smaller fruits; virgin forests of both hard and soft woods, more extensive than those of any other state in the Union; clays, shales and silica beds, for brick manufacture of every description, and glass of every quality; limestones of purest composition and of exhaustless quantity; building stones of every kind except marble, granite and other metamorphic rocks; and natural gas fields, far exceeding those of her sister state, Pennsylvania; and last, but not least, coal in great variety and quantity. These are some of the common possessions of West Virginia which, within the last few years, have attracted to her domain investment capital from many portions of the world.

I. C. White

It is only within the last few years that the richness and value of West Virginia's coal fields have been realized, first by capitalists outside the state and finally by her own citizens.

Greatest Coal Fields in the World

To the greatest coal fields in the world geologists have given the name Appalachian. Beginning near the northern line of Pennsylvania, latitude 42 degrees, longtiude 77 degrees, it extends southwestward through West Virginia, southeastern Ohio, eastern Kentucky and central Tennessee, ending in western Alabama, latitude 33 degrees, longitude 88 degrees, 900 miles from its northeastern terminus.

The shape of this field is that of a rude canoe, the two prows of which lie in Pennsylvania and Alabama, respectively, while the broadest portion of its body is found in West Virginia.

Three great trunk-line railways cross this coal field from east to west, while two others, the Virginian and Western Maryland, reach from its center to tidewater.

The three trunk-line railways all cut across the West Virginia coal field at nearly right angles to its length, and the following distances from the eastern margin of the coal field westward to the Ohio River as measured along each of them will give some idea of the coal area of West Virginia:

Baltimore & Ohio Railroad, Piedmont to Benwood	162.1	miles
Chesapeake & Ohio Railroad, Hinton to Huntington	147.0	miles
Norfolk & Western Railroad, Bluestone Junction to Kenova	194.08	miles

These are the distances as measured along their circuitous routes between the southeastern margin of the coal field and the Ohio River boundary of the state, so that the actual distance across the coal basin between the eastern edge of the coal field and the Ohio River at all the points named is practically the same, and in straight or air lines would be considerably less than the figures given above—in fact, only about 100 miles.

The length of the West Virginia field is given by the distance table of the Ohio River Railroad, which foots up 211.7 miles between Moundsville and Kenova, or about 150 miles air line measurement. Hence, in a rough way, the coal-measure area of the state may be said to occupy an irregular rectangle 100 miles wide by 150 in length, and extending from the Alleghany Mountain region northwestward to the Ohio River. This would give 15,000 square miles as the approximate area of the West Virginia field, over and under which the coal-measure rocks extend. But not all of this 15,000 square miles is underlain by good coal of commercial thickness, since the drill of the petroleum seeker finds many regions in the central portion of the basin, where there is apparently very little coal in the entire coal-measure column of rocks, and hence it is possible, if proper allowance were made for these barren zones, there would remain not more than 10,000 to 12,000 square miles of productive coal territory within the state, reckoned by the standard of thickness and quality as exhibited in the areas now operated by drift mines.

Character of West Virginia Coals

The several kinds of coal occurring in West Virginia, viz., ordinary bituminous, block, splint, cannel, smokeless, suited for every manner of use; coking, gas making, domestic, steam, by-product, cement burning, etc., are so well known to the coal-using public, and are so fully described in the volumes of the West Virginia Geological Survey, that it is unnecessary to burden this paper with such well-known facts.

The total amount of coal of future commercial thickness underlying the area of the state before mining operations began has been estimated by the West Virginia Geological Survey at 115,676,615,244 short tons, and allowing a mining wastage of 30 per cent, and deducting the 1,629,401,469 short tons already mined, would leave the enormous total of 79,344,000,000 short tons of commercial coal yet available in the West Virginia hills, or enough to supply the markets with 200,000,000 short tons annually for nearly 400 years.

The West Virginia Geological Survey does not have a department of statistics, and hence can only quote from the records published by the United States Geological Survey as to the production of coal, petroleum, natural gas and gasoline produced from natural gas.

The table on the following page of coal production gives in short tons the record of coal production for 61 years:

West Virginia Coal Production by Years

Year	Short Tons	Year	Short Tons
1863.....	444,648	1894.....	11,627,757
1864.....	454,888	1895.....	11,387,961
1865.....	487,897	1896.....	12,876,296
1866.....	512,068	1897.....	14,248,159
1867.....	589,360	1898.....	16,700,999
1868.....	609,227	1899.....	19,252,995
1869.....	603,148	1900.....	22,647,207
1870.....	608,878	1901.....	24,068,402
1871.....	618,830	1902.....	24,570,826
1872.....	700,000	1903.....	29,337,241
1873.....	1,000,000	1904.....	32,406,752
1874.....	1,120,000	1905.....	37,791,580
1875.....	1,120,000	1906.....	43,290,350
1876.....	896,000	1907.....	48,091,583
1877.....	1,120,000	1908.....	41,897,843
1878.....	1,120,000	1909.....	51,849,220
1879.....	1,400,000	1910.....	61,671,019
1880.....	1,830,000	1911.....	59,831,580
1881.....	1,680,000	1912.....	66,786,687
1882.....	2,240,000	1913.....	71,254,136
1883.....	2,336,000	1914.....	71,707,626
1884.....	3,360,000	1915.....	77,184,069
1885.....	3,369,062	1916.....	86,460,127
1886.....	4,005,796	1917.....	86,441,667
1887.....	4,881,620	1918.....	89,935,839
1888.....	5,498,800	1919.....	79,036,553
1889.....	6,231,880	1920.....	89,970,707
1890.....	7,395,000	1921.....	72,786,996
1891.....	9,220,665	1922.....	80,488,192
1892.....	9,738,755	1923.....	107,900,000
1893.....	10,708,578		
Grand total.....			1,629,401,469

Petroleum Production

The following table of petroleum statistics gives the production of oil from 1859 to and including 1923, and annually beginning with 1876, viz.:

West Virginia Petroleum Production by Years

Year	Barrels	Year	Barrels
1859 to 1875.	3,000,000	1900.....	16,195,675
1876.....	120,000	1901.....	14,177,126
1877.....	172,000	1902.....	13,513,345
1878.....	180,000	1903.....	12,899,395
1879.....	180,000	1904.....	12,644,686
1880.....	179,000	1905.....	11,578,110
1881.....	151,000	1906.....	10,120,935
1882.....	128,000	1907.....	9,095,296
1883.....	126,000	1908.....	9,523,176
1884.....	90,000	1909.....	10,745,092
1885.....	91,000	1910.....	11,753,071
1886.....	102,000	1911.....	9,795,464
1887.....	145,000	1912.....	12,128,962
1888.....	119,448	1913.....	11,567,299
1889.....	544,113	1914.....	9,680,033
1890.....	492,578	1915.....	9,264,798
1891.....	2,406,218	1916.....	8,731,184
1892.....	3,810,086	1917.....	8,379,285
1893.....	8,445,412	1918.....	7,866,628
1894.....	8,577,624	1919.....	8,327,000
1895.....	8,120,125	1920.....	8,249,000
1896.....	10,019,770	1921.....	7,822,000
1897.....	13,090,045	1922.....	*7,847,808
1898.....	13,615,101	1923.....	*7,749,924
1899.....	13,910,630		
Grand total.....			337,470,442

*Estimated.

Natural Gas Production

As is well known, West Virginia has long stood first of all the states of the Union in the production of natural gas, and still maintains that primacy up to the end of 1923. The following table gives the production of natural gas marketed from West Virginia beginning with 1906, the first year for which there are any statistics, up to the end of 1923.

West Virginia Natural Gas Production by Years

Year	Cu. Ft.	Year	Cu. Ft.
1906...	119,400,392,000	1915...	244,004,559,000
1907...	122,687,236,000	1916...	299,318,907,000
1908...	112,181,278,000	1917...	308,617,101,000
1909...	166,435,092,000	1918...	265,160,917,000
1910...	190,705,869,000	1919...	234,094,800,000
1911...	206,890,576,000	1920...	239,718,800,000
1912...	239,006,682,000	1921...	174,920,800,000
1913...	245,453,985,000	1922...	195,288,000,000
1914...	238,740,162,000	1920...	*190,000,000,000
Grand total.....			3,792,625,156,000

*Estimated.

Probably as much more gas has passed into the air unused for any purpose before its great fuel value could be utilized through pipe lines to great fuel-consuming centers like Pittsburgh, Cleveland, Cincinnati, etc.

Natural-Gas Gasoline

Just how many billions of gallons of gasoline formerly passed into the air in the West Virginia oil and gas fields from oil wells and wasted natural gas will never be known, but the quantity is certainly enormous.

The following table of production of this natural-gas gasoline by both compression and absorption methods since the beginning of 1911 will give a faint idea of the loss during the long wasteful period of the previous years:

West Virginia Gas Gasoline Production by Years

Year	Gallons	Year	Gallons
1911.....	3,660,165	1918.....	37,603,903
1912.....	5,318,136	1919.....	52,150,045
1913.....	7,662,493	1920.....	58,941,488
1914.....	9,278,108	1921.....	54,646,053
1915.....	10,853,608	1922.....	56,795,713
1916.....	18,765,056	1923.....	*60,000,000
1917.....	32,668,647		
Grand total.....			408,343,415

*Estimated.

Iron Ores

Iron ores of many grades are present in commercial quantity in Jefferson, Morgan, Hampshire, Hardy, Pendleton, Pocahontas, Greenbrier and Monroe counties, probably totaling 250,000,000 to 300,000,000 tons, including all grades, which some time in the not distant future will find a ready market.

Limestone

Next to coal, probably, limestone is the second most valuable mineral resource of West Virginia. The great quarries in Jefferson and Berkeley counties have long been famous for the finest quality of limestone in almost inexhaustible quantity, while Morgan, Hampshire, Mineral, Hardy, Grant, Tucker, Preston, Monongalia, Randolph, Pendleton, Pocahontas, Greenbrier, Monroe, Summers and Mercer hold vast quantities of excellent limestone suitable for every purpose except where the purest white lime is desired. Large deposits of excellent dolomite also exist in Jefferson county. These limestones are all fully described in the State Survey volumes.

Sandstone

Sandstone suitable for building purposes is abundant in nearly every county, while *glass sand* of finest quality occurs in vast quantity in the counties of Berkeley, Morgan, Hampshire, Mineral, Hardy, Grant and Pendleton.

Window and ordinary bottle glass sand is abundant in Monongalia, Preston, Tucker, Randolph, Webster, Pocahontas, Greenbrier, Fayette, Raleigh, Summers, Monroe and Mercer counties.

A vast quantity of building, molding and plastering sand occurs on higher terraces of many of the state's rivers.

Shales and Clays

Shales and clays for all manner of common, pressed, paving, fire-brick and sewer tile are present in many of the counties in great quantity.

Soils

The soils of the state are of great fertility and raise abundant crops of everything grown in the temperate zone, while the finest of bluegrass, alfalfa, soybeans, corn, wheat and everything best fitted for raising sheep and wool, cattle, horses, pigs, poultry, fruits and flowers of every description flourish in great abundance. The finest-flavored apples, peaches, pears, grapes and plums grow on the West Virginia hills, while its potatoes and tomatoes cannot be excelled anywhere. Tobacco is also an important crop in several counties of the state.

Water-power

In potential water-power the state stands high (third) in the list, and development of the same is just getting under way on the Cheat and New Rivers.

WEST VIRGINIA

Total Area, 24,170 Square Miles; Land, 24,022 Square Miles; Water, 148 Square Miles

	1880	1900	1910	1923
Population	618,457	958,800	1,221,119	1,551,156
Property, true value	$350,000,000	$659,653,000	¶$2,427,930,000	†$4,677,919,000
Manufactures:				
Capital	$13,883,390	$49,103,138	$150,922,586	*$339,190,000
Products, value	$22,867,126	$67,006,822	$161,949,526	‡$310,423,000
Mines, Quarries and Wells:				
Capital	.....	.....	$219,466,909	*$533,138,835
Products, value	.....	.....	$76,287,889	*$295,606,620
Furniture Manufacturing:				
Products, value	.....	$454,000	$965,000	*$3,220,000
Pig Iron made, tons	62,802	166,758	174,661	¶¶702,454
Coke made, tons	138,755	2,358,499	3,803,850	1,961,000
Lumber cut, feet	180,112,000	773,583,000	1,376,737,000	†554,277,000
Mineral Products, value	$2,484,699	$47,055,384	$105,058,311	†$358,772,000
Coal mined, tons	1,829,844	22,647,207	61,671,019	107,900,000
Iron Ore mined, tons	.....	***	†††	.....
Petroleum, barrels	179,000	16,195,675	11,751,871	6,358,000
All Land in Farms, acres	.....	10,654,513	10,026,442	*9,569,790
Improved Land, acres	3,792,327	5,498,981	5,521,757	*5,520,308
Number of Farms	.....	92,874	96,685	*87,289
Value all Farm Property	.....	$203,907,349	$314,738,540	*$496,439,617
Value Farm Land	.....	$134,269,110	$207,075,759	*$307,309,704
Farm Products, value	$19,360,000	$44,769,000	$70,770,172	$140,700,000
Farm Crops, value	.....	$25,696,000	$36,167,000	$80,400,000
Tobacco Crop, pounds	.....	3,087,140	14,356,400	7,740,000
Grain Crop:				
Corn, bushels	17,307,000	19,299,000	18,200,000	20,128,000
Wheat, bushels	5,131,000	4,453,000	3,012,000	2,964,000
Oats, bushels	2,412,000	2,769,000	2,772,000	4,704,000
Live Stock:				
Cattle, number	446,000	640,000	620,000	585,000
Sheep, number	675,000	969,000	910,000	504,000
Swine, number	511,000	443,000	328,000	316,000
Horses, number	126,000	185,000	180,000	159,000
Mules, number	6,000	11,000	12,000	15,000
National Banks:				
Resources	$5,939,454	$25,242,824	$72,001,259	$207,425,000
Capital	$1,861,000	$3,849,660	$9,092,470	$12,811,000
Deposits	$2,040,126	$15,548,822	$44,091,084	$145,347,000
Other Banks, deposits	$4,034,743	$21,317,823	$56,814,000	$192,707,000
Railroad Mileage	691	2,228	3,601	†4,047
Highway Expenditures	.....	**$587,870	††$2,483,747	$21,665,000
Public Schools, expenditures	$707,500	$2,009,100	‡‡$3,252,900	†$18,616,000
Assessed Value Property	$146,991,688	$240,634,580	$1,120,346,066	$2,109,813,000

*Census 1920. †1922. ‡1921. ¶1912. **1904. ††1914. ‡‡1908. ¶¶Includes Georgia, Kentucky and Texas. ***Included with Virginia. †††Included with Kentucky.

The Development Work of a Railroad

The Central of Georgia's Notable Success in Colonization—Agriculture and Industry -Its Co-operative Methods—A Pioneer in the South.

The Central of Georgia Railway considers itself a citizen of each community that it serves, with its 1920 miles of line in the states of Georgia and Alabama. It tries to be a good citizen and a helpful neighbor. With this end in view, the railway maintains a development department, the object of which is not only to originate and increase traffic but to aid in the progress and prosperity of its territory.

The Central of Georgia was a pioneer in such work in the South, the beginning of its development department dating back to 1888. The earlier activities of the department were largely concerned with immigration and colonization, although the development of natural resources has always been the main object of its endeavors.

Agriculture is a basic industry in Georgia and Alabama, and much attention has been paid to improved methods of farming. A notable work of recent years has been the encouragement of better pastures. It is a long way from the sowing of pasture seed until the grass grows and is converted into milk and meat that is hauled by the railroads, or into extra dollars that go into the pockets of the pasture owners, of which the railroad gets its share. However, the experience of 4 years has proved that pastures in Georgia and Alabama are affording more grazing per acre than the best pastures in sections long held up as the standard of excellence. Going further back to first principles, the Central of Georgia is now planning to extend the use of methods which are fundamentally necessary for increased per-acre yield. Research has established the fact that easier and surer results than have heretofore been known will follow the adoption of certain methods for increasing the fertility of the soil, but to get these methods into effect quickly requires more of expenditure and more of departure from the usual than the average farmer is willing to undertake. Therefore, the Central of Georgia has authorized expenditures to cover half the cost of establishing soil-building tests in those counties, where it finds a co-operative spirit that is willing to meet it half way. Co-operation of the farmers in Central of Georgia territory has readily been forthcoming in both soil redintegration and pasture building.

The principal source of revenue of Georgia and Alabama is now from agriculture, but these states are blessed with vast and varied mineral resources, which have not been developed nor thoroughly prospected. Coal, iron, cement, marble, granite and ocher are successfully produced on a large scale. Georgia ranks first in the production of kaolin, but the Coastal Plain of Middle Georgia carries vast deposits of kaolin and refractory clays sufficient to supply the needs of the nation for generations to come.

The industrial department of the Central of Georgia in co-operation with the United States Bureau of Mines has just finished exhaustive research and plant tests, proving that this clay is suitable for the manufacture of face brick, fire brick, pottery, electrical porcelains, floor tile, wall tile and sanitary ware; also as a filler in paper, oil cloth, rubber, paint, etc. Since the deposits are so situated as to permit mining and marketing with a maximum of economy, it remains only for enterprising manufacturers to step in and capitalize the results.

There are fifty-two known commercial minerals. Forty-four of these occur in the territory served by the Central of Georgia. They include asbestos, aplite, barytes, bauxite, buhrstone, chert, brick and tile clay, kaolin, refractory clay, coal, corundum, diorite, dolomite, feldspar, fire clay, flint, fuller's earth, gold, granite, graphite, gravel, halloysite, iron ore, limestone, magnetite, manganese, marble, mica, ochre, onyx, pegmatite, pyrite, quartz, quartzite, rutile, sand, sandstone, sap brown, shale, slate, soapstone, talc, trap rock, and tripoli.

Prospecting and research, like that which was done with kaolin, would reveal that many of these minerals are worthy of development.

The ceramic department, which has just been established at the Georgia School of Technology, is now equipped for investigation and research of some of these minerals.

It is perfectly natural the textile industry in the South should have made its first development in the Upper Piedmont, where there was power, convenient coal and a surplus of native labor; but as that section reaches its limit the mills will turn to Alabama and Georgia, which are largely in the Lower Piedmont and equally as well supplied with power, coal and labor. Georgia and Alabama now have four million active spindles and eighty-five thousand active looms. Fifty-seven per cent of the textile plants in Georgia and 36 per cent of those in Alabama are in cities served by the Central of Georgia Railway.

The developed and undeveloped water-powers of Alabama and Georgia aggregate three and one-half million horsepower. The timber supply, present and future, offers many suitable and attractive locations for paper mills and woodworking plants.

A rational and logical development for states of such agricultural and industrial potentialities as Georgia and Alabama is a balanced one, because the two are interdependent and rarely occur together. We should not bury, or leave buried, any of our talents.

So much for the development of natural resources of the territory. The management has also been active in the development of co-operation on the part of the human element, which is such an important factor in the success of any enterprise. When the property was restored to its owners at the end of Government control, four and a half years ago, the management was confronted with the task not only of rehabilitating its facilities but of restoring the morale of its forces. Operating results prove the efficiency with which this task has been accomplished.

The freight business of the railway, as measured by the number of tons carried one mile, was 69 per cent greater in 1922 than in 1910.

This substantial saving in the cost of producing freight service was effected by well-planned expenditures for improvements and extensions to facilities. Old locomotives were replaced by those having greater tractive power, so that greater tonnage could be handled in a train; terminal facilities were enlarged; new yard tracks and new side tracks were laid; modern signals were installed, and other improvements were made. Since 1910 the Central of Georgia has expended nearly $20,000,000 in this kind of work.

One index of efficiency is the average miles per car per day. On the Central of Georgia last year this figure for the entire year was 32.86 miles.

The Story of a Railroad

We are giving here the outline of a story about a railroad whose life goes back to the South of olden days, surviving the vicissitudes of war and the Reconstruction period and coming up to the present when it is filling an important part in the life and progress of the Southern states east of the Mississippi.

The management ever has been, and hopes it ever will be, mindful of its responsibility to the public and of the vast possibilities for growth in that section of the country in which its lines are laid.

It is printing this advertisement as a matter of record, and perhaps somewhat as a matter of pride, which may be justified, but most of all to call attention to an empire rich in possibilities which discloses fresh opportunities for brain and brawn and wealth production every day.

From the days of long ago, when the old Richmond and Petersburg Railroad was built by slave labor, this company and its present-day ramifying interests, which cover such a wide area, has been owned largely by Southern men who believe in the South and the South's opportunities.

Reference is made further on to the purchase by Baltimore interests immediately following the Civil War of the Wilmington and Weldon Railroad. The farsightedness and sagacity of Mr. William T. Walters, father of the present chairman of the board of directors of the Atlantic Coast Line Railroad, was shown not only in this but in the purchase, with associates, of other parent roads, out of which the present system has developed. They saw the possibilities and opportunities of the South, and shortly after the Civil War they began to invest their money there.

There is offered today in this territory the greatest chance for the profitable investment of capital, the economic location of manufactures and successful agriculture that exists anywhere.

The Atlantic Coast Line Railroad Co. was originally chartered as the Richmond & Petersburg Railroad Co. by Act of the General Assembly of Virginia passed March 14, 1836, the change to the present corporate title having been made April 23, 1900. The Richmond & Petersburg Railroad Co. completed in 1838 the construction of a main line of railroad, 22 miles long, between Richmond and Petersburg, Va., and throughout its history has never been through a reorganization. In 1898 the Richmond & Petersburg Railroad Co. acquired the property of the Petersburg Railroad Co., chartered in Virginia in 1830, owning a main line of road between Petersburg, Va., and Weldon, N. C., about 60 miles, and the name of Richmond & Petersburg Railroad Co. was changed to Atlantic Coast Line Railroad Co. of Virginia. In 1900 this company acquired the property of various other affiliated companies, owning about 1571 miles of railroads in Virginia, North and South Carolina, and the name was finally changed to Atlantic Coast Line Railroad Co. The merger in 1900 completed the consolidation into one corporation of the ownership of about 1666 miles of railroad lines which had previously been owned and operated as separate corporations but under a common control and administration. With other mileage operated under trackage rights and lease, the total main line and branches in 1900 had grown to 1758 miles.

From 1872 the roads composing this system had been known to the public as the "Atlantic Coast Line."

While the railroads forming the "Atlantic Coast Line" have, since the consolidation of 1900, been owned and operated under the charter of the original Richmond & Petersburg Railroad Co., the company as today constituted is the development of a further merger in 1902 of the Atlantic Coast Line Railroad Co. and the Plant System of railroads, and now combines in itself what was formerly 103 separate corporations. The most important of these 103 corporations was the Wilmington & Weldon Railroad Co., which was chartered in North Carolina in 1834 as the Wilmington & Raleigh Railroad Co., but changed its name to Wilmington & Weldon Railroad Co. in 1855, at which time the company owned and operated 162 miles of railroad between Wilmington and Weldon, N. C. The line was opened in 1840 and was at that time the longest line of railroad owned by one com-

RICHMOND, VA., PASSENGER TERMINAL—AEROPLANE VIEW

TARPON SPRINGS, FLORIDA

pany in the world. The various railroads constructed in the South prior to the Civil War were short-line roads built principally to connect the back country with navigable water, or, where all-year navigation was uncertain and canals unsatisfactory, as an improvement over the water-transportation facilities from the inland settlements to the markets at the ports.

In Virginia and the Carolinas the railroads were constructed not with the purpose of effecting through lines for travel or freight, but with the object of securing the inland trade for which the port towns—Petersburg on the Appomattox, Richmond on the James, Norfolk on Hampton Roads, Wilmington, Charleston and Savannah on the Atlantic Ocean competed. Consequently these short lines were in most instances not physically connected, a stream or the length of the town at which each terminated would intervene or the gauge of one road differed from that of the next. During the period immediately subsequent to the Civil War the lines were connected with each other owing to the development of mail service and of through passenger traffic and the competition with the coastwise steamship lines for the business. In the decade before the Civil War, iron rails weighing about fifty pounds to the yard replaced the original rails, which consisted of iron strips laid on wooden stringers. Though most of the Southern roads were, prior to 1860, successful in developing traffic at very high passenger and freight charges and were financially profitable, the properties suffered severely as a result of the Civil War, through destruction by the Federal Army, through dismantling of property for use by the Confederate Government where military necessity dictated and by inability to maintain the roads in serviceable condition. The close of the war found the value of the roads negligible, the owning companies in serious financial straits and without credit and unable to refund maturing debts or secure funds to rebuild destroyed property and restore existing lines for operation. The economic condition of the Southern country and the Southern people was at its lowest ebb, and invariably it was found necessary either to sell the properties at foreclosure proceedings or to pass the controlling ownership of the companies to interests commanding the required financial resources. Prior to the Civil War only a small mileage of railroad line had been constructed south of Charleston, under plans to make a short line from the Atlantic Ocean to the Gulf ports to avoid the long water trip around Florida and improve on the overland stage route. These plans were interrupted by the war, but soon after the close of the war the extension of the old roads and construction of new ones was actively prosecuted, almost entirely with money borrowed in Baltimore, Philadelphia and New York, or in a few instances with assistance of the states' credit. The country was but sparsely settled, and agriculture, naval stores and lumber were practically the sole industries. Competition for traffic was keen and many roads encountered severe financial difficulties and were reorganized.

In 1869 Baltimore capitalists acquired control of the Wilmington & Weldon Railroad Co. and invested large sums in the rehabilitation of its property. The management was in time successful in its efforts to restore the physical condition of the property and re-establish its earning capacity. The road connected on the north with the Petersburg Railroad and on the south with the Wilmington & Manchester Railroad, and, track connection between the lines of these roads having been made by building two bridges over the Cape Fear River at Wilmington, N. C., formed a part of the through route of travel from the North via Washington, Richmond, Petersburg to Wilmington, Charleston and Savannah in the South.

With the Wilmington & Weldon as a nucleus, the management constructed branches and extensions, organized other companies to construct and operate lines connecting with the Wilmington & Weldon, and acquired control of connecting lines to the North and to the South, the aggregate mileage of which as finally consolidated in 1900 into Atlantic Coast Line Railroad Co. was, including trackage rights and sole leasehold interest, 1758 miles, extending from Richmond and Norfolk to Wilmington, Charleston, Columbia and Augusta.

The original member of the Plant System of Railways was the Savannah, Florida & Western Railway Co., chartered in Georgia in 1879 to acquire the property of the Atlantic & Gulf Railroad Co., sold at foreclosure to Mr. H. B. Plant and associates. The Atlantic & Gulf Railroad extended from Savannah to Bainbridge, Ga., a distance of about 236 miles, with various branches. Mr. Plant and his associates organized The Plant Investment Co., which company acquired the controlling ownership in the Savannah, Florida & Western Railway Co. From time to time The Plant Investment Co. purchased and reorganized or otherwise acquired control of various roads connecting with the Savannah, Florida & Western Railway and affiliated lines, and organized companies to construct and operate new lines in South Carolina, Georgia, Florida and Alabama.

In 1901 several of the companies owning lines composing parts of the Plant System were absorbed by the Savannah, Florida & Western Railway Co. In May, 1902, The Plant Investment Co. sold all of its railroad property, including investments in all of the companies forming the Plant System, to the Atlantic Coast Line Railroad Co. The system at this time included approximately 2235 miles, extending between Charleston, S. C.; Savannah, Ga.; Jacksonville, Tampa and Punta Gorda, Fla., and Montgomery, Ala. After these consolidations the Atlantic Coast Line Railroad Co. owned and operated 3986 miles of main and branch lines, which by additional construction, acquisition of operating rights and absorption of other lines had been increased to December 31, 1923, to 4866 miles. The main line of the road between Richmond and Jacksonville, about 681 miles in length, has been or is now being double tracked. This work will be completed early in 1926. The company operated a total of 404 miles of double track on December 31, 1923.

In the fall of 1902 the Atlantic Coast Line Railroad Co. acquired control of the capital stock of the Louisville & Nashville Railroad Co., the lines of which company connected with the Atlantic Coast Line at Montgomery, Ala., at River Junction, Fla., and also at Atlanta and Augusta, Ga. over the rails of the Georgia Railroad leased to the Atlantic Coast Line Railroad Co. and Louisville & Nashville Railroad Co. jointly. The Georgia Railroad controls singly and jointly 562 miles of railroad.

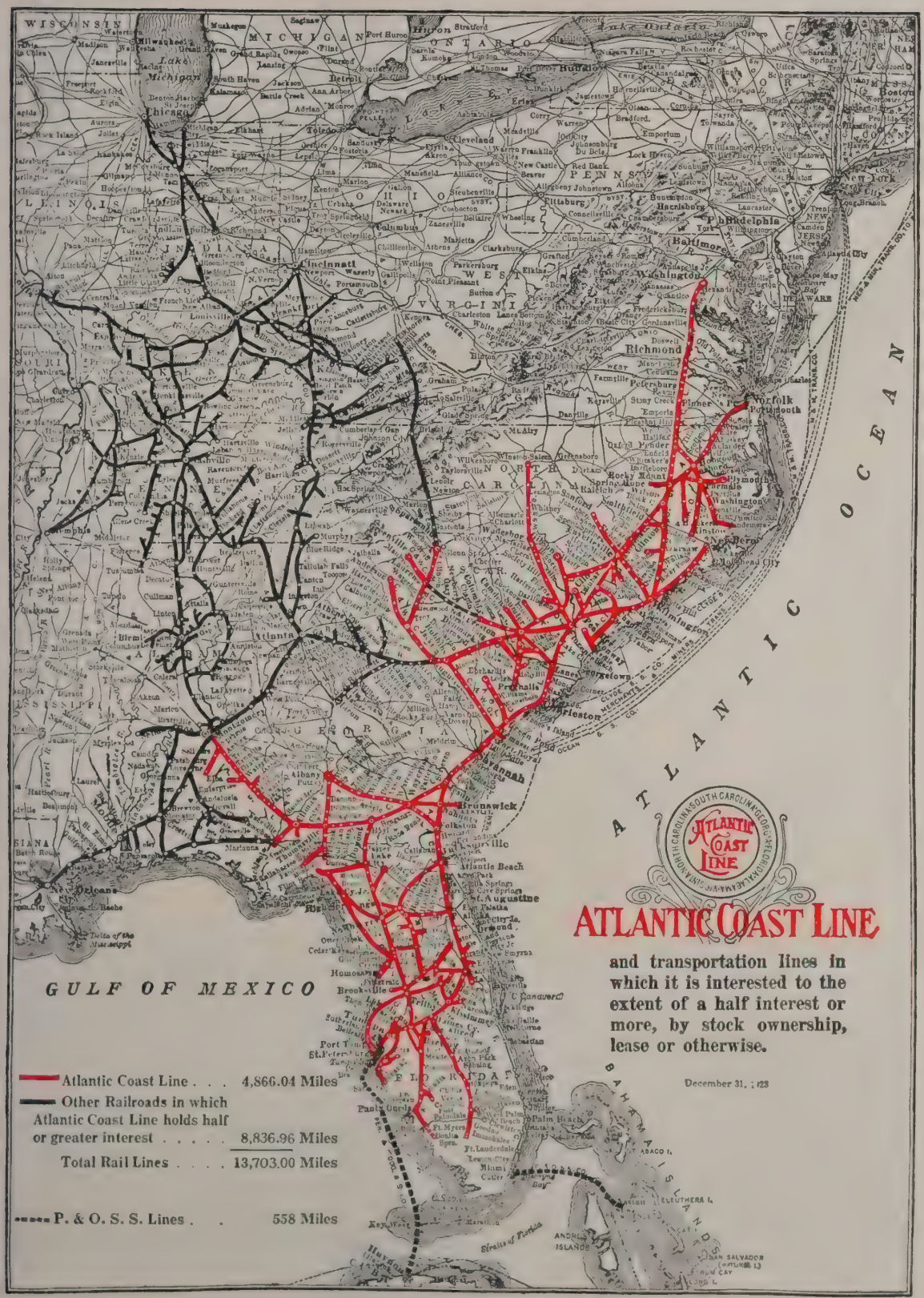
The owned and operated lines of the Louisville & Nashville then extended between Cincinnati, Louisville, Evansville, St. Louis, Memphis, New Orleans, Mobile, Pensacola, River Junction (Fla.), Nashville, Birmingham, Atlanta and Montgomery, and, with various branch lines, had an aggregate length of 3719 miles. The company then controlled the Nashville, Chattanooga & St. Louis Railway, the Atlanta, Knoxville & Northern Railway and Birmingham Southern Railroad, with an additional mileage of approximately 1196 miles.

The Atlantic Coast Line Railroad Co. is now the parent company of a system having a total mileage of 13,703 miles of first track at December 31, 1923, operating through or into fourteen states, viz: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Tennessee, Kentucky, Missouri, Illinois, Indiana and Ohio.

A study of the map of the Atlantic Coast Line and its affiliated roads shows that they cover a territory which for diversity of agricultural and industrial potentialities is unequaled by any other similar area in the world.

Here is an empire of immeasurable latent wealth. To

JAMES RIVER BRIDGE AT RICHMOND, VA.


ATLANTIC COAST LINE
ATLANTIC COAST LINE
and transportation lines in which it is interested to the extent of a half interest or more, by stock ownership, lease or otherwise.
GULF OF MEXICO
ATLANTIC OCEAN
Atlantic Coast Line . . . 4,866.04 Miles
Other Railroads in which Atlantic Coast Line holds half or greater interest . . . . . 8,836.96 Miles
Total Rail Lines . . . . 13,703.00 Miles
P. & O. S. S. Lines . . 558 Miles
December 31, 1923

JACKSONVILLE, FLA., TERMINAL STATION

this empire nature has given a bank whose resources can be drawn upon for centuries to come without limit and yet without exhausting the capital. This bank, whose capital is climate and soil, water-powers, timbers and minerals of almost every variety, will grow richer as its capital is drawn upon. Its climate, ranging from that of the Piedmont and mountain regions to the balmy air of the South Atlantic Coast, of Florida and of the Gulf Coast, gives every variety for every human need of climatic conditions. Its soil will produce a greater variety of the things needed for the country's food supply than that of any other known region. Year by year it is being demonstrated that there is practically no limit to the extent of diversified farming which can be carried on profitably in this territory.

Immediately tributary to the Atlantic Coast Line are trucking or early vegetable interests, increasing from year to year in volume and in value, which to a large extent help to feed the North and West during the entire winter season. This industry can be increased to the profit of the growers and of the South and of the country at large just as rapidly as the consuming power of the nation demands more food. Cabbages, potatoes and almost every other variety of vegetables grow luxuriantly throughout much of that region, while Florida alone is annually shipping nearly 100,000 carloads of early vegetables and citrus fruits.

The connecting or affiliated roads of the Atlantic Coast Line bring this entire territory, with its varied resources, into intimate touch with the consuming markets of the East and West. From Richmond, through Virginia and the Carolinas, the Atlantic Coast Line, as shown by the map, passes through a territory where the winter tourist business is growing so rapidly that it will require during the coming winter fifteen daily through trains to take care of it. As wealth and population increase in this country and the charms of the South's winter climate become more generally understood, the tourist business from the North and West to the South will expand at a rate which will tax the hotel facilities of that entire region.

It is difficult to overestimate the importance of tourist travel. The policy of the Atlantic Coast Line in giving the best facilities in trains, and track, and speed, and safety to handle this traffic indicates the appreciation of its management as to its importance in the permanent upbuilding of the South. The tourist in many cases

FORT MYERS, FLA., PASSENGER STATION

PORT TAMPA, FLA., NEW PHOSPHATE ELEVATOR No. 5

becomes a permanent settler or investor. Henry M. Flagler went to Florida as a tourist, but before he died he had invested probably $75,000,000 in railroad building and hotel construction along the East Coast of that state. Thousands and tens of thousands of those who have gone South as sightseers, healthseekers or tourists seeking to escape the rigors of Northern and Western winters have become identified either by residence or investments in the upbuilding of this territory.

The growth of this winter travel has necessitated the work of double tracking the entire Coast Line from Richmond to Jacksonville, and this work it is expected will be completed early in 1926.

The Atlantic Coast Line is now adding another direct connection with the Louisville & Nashville over the Clinchfield Railway, which crosses the Allegheny Mountains in North Carolina, Tennessee and Kentucky, and thus connects it with the great mineral regions of those three states.

Experts familiar with climatic and soil and mineral and timber conditions, and hydro-electric potentialities, will study in vain to find any territory which offers to the farmer, the truck grower, the fruit grower, the health or pleasure seeker, the industrialist or the mining operator a region or empire which can offer equal opportunities to those available in this territory. Here is an empire imperial in extent, imperial in resources, the development of which, large as it has been, is only in its infancy compared with that which will be seen in coming years.

Mines and forests and water-powers will yield their wealth to a greater extent than was ever thought possible. An abundant labor supply and freedom from labor troubles make the South peculiarly desirable for manufacturers. This section has a population which is nearly 100 per cent American stock—some states having less than 2 per cent of foreign stock.

A recent example of the expansion of industry Southward has been the marked increase in the establishment of cotton mills in this territory. Authorities in the paper manufacturing industry predict that the future expansion in this field will be found in the Southern states. The South has more than 50 per cent of the country's timber supply, thus affording raw material for those engaged in this important line. The list could be expanded almost indefinitely.

It is counted a privilege by the officers and employes of the Atlantic Coast Line and its affiliated companies to co-operate with inquirers in supplying, through its various offices, the fullest information of interest and value to farmers, homeseekers and manufacturers. Recognition of the South's advantages and opportunities, for the location of profitable industries and farms with pleasant home surroundings, is turning thousands to this territory every year. Health, happiness and the reward that goes with well-directed industry are assured to those who take part in the South's development.

FREIGHT TERMINAL ATLANTIC COAST LINE, TAMPA, FLA.

The Heart of Florida Opened

To Immediate Development by the Seaboard Air Line Railway Through the Completion of Its Extension—The Florida Western & Northern Railroad.

C. J. Blanchard, formerly of the United States Department of the Interior

In his conception of the requirements of the state of Florida and his foresight, the President of the Seaboard Air Line Railway Company, S. Davies Warfield, has "builded better than he knew."

When he first developed his plan for bringing the "Highlands" of central Florida as well as far Eastern and Western points within easy access of both the East and West coasts of the peninsula, there were many who doubted the wisdom of the undertaking. Now that the problem has been mastered and a vast region lying within the center of the peninsula of Florida extending in a southeasterly direction towards the Atlantic Coast has been opened up to trunk line facilities, Floridians have begun to realize what this means to their state, and the outside world and those who travel what it means to the great numbers of people who are somewhat familiar with Florida but not with this wonderful territory.

The Seaboard Air Line Railway's extension—the Florida Western & Northern Railroad—will be completed during the month of January. In piercing central Florida it crosses Sumter, Lake, Polk, Highlands, Okeechobee and Palm Beach counties, embracing a total area of five million one hundred thousand acres, of which only two hundred and fifty thousand acres, or 4 per cent, is in cultivation.

Larger than the state of New Jersey, this territory includes a large part of the famous Highlands of Florida, the center of the citrus industry, and innumerable charming lakes. Lack of proper transportation has held back development of extensive areas. This "Ridge," or "Highlands" district, consists of rolling, sandy terraces, rising to a maximum elevation of 300 feet above sea level, and extends from the center of Highlands county northward into Georgia. These terraces, through their excellent air drainage and the large number of lakes, are becoming famous for their extensive citrus groves. Here and there thriving communities have sprung up and fine groves of oranges, grapefruit, tangerines, mangoes, alligator pears and other tropical fruits have been planted and are now producing.

Hundreds of acres are in vineyards, while thousands of acres are being devoted to early vegetables and strawberries, watermelons and pineapples, along with general farming, dairying, livestock and poultry raising. Fertility of soil, favorable climate and abundant rainfall are attested by the high average value of crops, as shown by a recent state census of agriculture, which reports an average value per acre of all crops in this territory (excluding livestock) of $70 per acre. This is nearly three times the average for the United States.

Barriers of Isolation Broken Down

The rapid and permanent development of this virgin empire is now assured by the work of the Seaboard Air Line in the Florida Western & Northern Railway, the Seaboard's extension to the East Coast of Florida, opening to settlement practically the entire area.

The completion of this extension of the Seaboard Air Line Railroad is an event in the history of Florida travel from points east and west. It inaugurates the first service by any trunk line to the East Coast of Florida over its own rails (south of Richmond) without transfer of its trains or cars to a connecting or interchange railroad. In addition, it provides the first continuous coast to coast

HAMMOCK LAND IN THE HEART OF FLORIDA

or cross-state short line service connecting the East and West coasts of Florida.

Undertaken at a period of stagnation in railway construction and carried forward with unprecedented swiftness in the face of unusual obstacles, the conception and construction of the Florida Western & Northern extension of the Seaboard is a notable achievement attributable to the indomitable faith and energy of the Seaboard's President and Chairman of the Board. In the extension of his railroad, Mr. Warfield inaugurated a new policy and solved a problem in railroad finance which has attracted wide and favorable comment.

In the sale of the $7,000,000 of mortgage bonds, the proceeds of which were used in constructing the new railroad, a participation was given the purchaser of each bond in any advance in the value of more than 150,000 acres of land acquired, to be realized through its development as the result of the transportation facilities to be furnished by the railroad. This participation comes through the Land Company of Florida, organized by the Seaboard Air Line for this purpose. So, in addition to giving railroad facilities to the territory traversed, a great development work of supreme interest to the state is also inaugurated.

Apart from the benefits which will accrue to the state of Florida, to the traveling public and to the shippers, care has been taken to safeguard homemakers and industries from exploitation. The properties of the Land Company of Florida, which are located in Okeechobee and Palm Beach counties, are being subdivided into blocks of approximately 5000 acres each and will be offered on attractive terms to those who desire to develop them.

Helping the Settler Make Good

The Development Department of the Seaboard Air Line is co-operating with the Land Company in this work. The Seaboard enjoys an enviable reputation for service among the farmers in its territories in introducing new and profitable crops, co-operation in marketing and in other practical lines. Icing and packing plants will be provided and fast through freight service will be available.

Winter and Year-Round Homesites

For the Northerner who seeks rest and recreation or a retreat from the chill of winter the scenic Highlands makes strong appeal. The region traversed by the Seaboard contains countless beautiful lakes, affording ideal boating, bathing and fishing. Gentle slopes around these lakes offer pleasing sites for homes. Numerous communities, made up of neighbors and friends from the North and West, have erected or are building charming residences, and many find profitable occupation during the winter months in developing groves of citrus and other fruits. A system of modern surfaced highways links these lake communities, and the new cross-state line of the Seaboard Air Line places them in easy access to Palm Beach, Miami, Tampa, Sarasota, St. Petersburg and other popular coast resorts and cities. The region is high and healthful, with pure water and a livable year-round climate. Excellent golf links and tennis courts are available for those who enjoy these sports.

WEST PALM BEACH, THE EASTERN TERMINUS OF THE SEABOARD'S FLORIDA EXTENSION

Opportunities for Investors

A dozen or more prosperous and up-to-date towns are established, with excellent stores, hotels, schools and churches. The population of these communities is largely American-born.

As the development work of the Land Company proceeds these communities are certain to grow rapidly. Investors will find attractive opportunities in all of them.

The Development Department of the Seaboard Air Line, located at Savannah, Ga., will be glad to answer inquiries relating to this region and is fully equipped to handle inquiries from manufacturers considering the advantages that the Southern states offer in the various lines of industry.

Kelsey City and Palm Beach Harbor, Fla.

A Chapter of City History

The founder of Kelsey City came to the Florida coast in the nick of time. Those who accompanied Harry S. Kelsey to the present location of the city bearing his name cannot forget the incidents and scenes of that eventful month.

The land dealers who induced Mr. Kelsey to pay their price for the vast acreage he purchased thought that they had "put one over" the simple gentleman from New England and silently smiled over the big "Land Scoop." There was little else talked of in real estate circles other than the "Big Deal" foisted upon the unsuspecting Mr. Kelsey from Boston. But that which passed through the swift-acting brain of the Little Man from Gloucester Bay pictured the present city, by ocean, lake, Dixie Highway, canals and the Intercoastal Yacht Channel, which runs from New York to the end of Biscayne Bay, along the only tropical region of the United States. And upon this elevated tract Mr. Kelsey builded the city named after him, with an elevation of fifty feet above the tide level of the Atlantic Ocean, with miles of ocean beach.

Mr. Kelsey engaged Olmstead Brothers and John Nolen of Boston, internationally known city planners, to lay out Kelsey City. So far as is known, Kelsey City is the first scientifically-planned city platted and recorded before a lot was offered to the people in the United States.

Civic center sites, baseball park, blocks for all public buildings, schools, churches, park and recreational circles were set aside and deeded to Kelsey City to be used forevermore for the purposes designated.

The streets are 135, 120, 80 and 60 feet in width. The alleys in the business zone and shopping district are 40 and 50 feet in width, so that parking upon the main avenues is eliminated. Kelsey City Park is one of the finest and most attractively planned in all the Southland, facing the waters of Lake Worth and the most highly restricted residence sector of Kelsey City, beautified with rare exotic plants and tropic shrubbery and royal palms and cocoanut; wide walks of colorful pavements, pagodas and fountains; retiring cottages and tea-rooms; music pavilion and recreation pier and yacht basin.

The golf courses are placed at the entrance of one of the main streets, and nearly two hundred acres are set aside for this purpose. The best golf architects are building the courses, and there will be two eighteen-hole links for championship players when the courses are completed. Nine holes are now ready for players.

Kelsey City and its immediate acreage is situated upon both sides of the Dixie Highway, the East Coast and Seaboard railways and the Intercoastal Inland Waterway, so that all traffic and all yachts pass through Kelsey City.

Industries

In three years there has been established one of the largest lumbering mills in South Florida, known as the Drake Lumber Company. This milling company has been in this section of Florida for nearly a quarter century and has a mill with a cutting capacity of a quarter million feet. The Kelsite Stone Plant manufactures ornate stone products, fountains, roof tile, cement blocks and many other stone products. The Reconstructed Stone Works, making pressed cement building blocks and forms, with granite, slag and glass faces, is crowded with orders going into buildings in Kelsey City and other cities of the state.

The Kelsey City tile plant reproduces the Parian and other imitation marbles; manufactures antique designs, floral designs with the new French hydraulic and electric presses, with machinery imported from France. Handmade tile is also made. Orders at this writing are ahead of the plant's production four months. Many new store buildings are now in construction, and demands for houses and apartments far exceeds the supply.

Kelsey City and Palm Beach Harbor

Kelsey City is located a mile and a half from the new Ocean Inlet, just north of Palm Beach, and its lake waters afford a safe harbor for all small craft at the head of the lake and at the mouth of the Intercoastal Yacht Channel. Really, Palm Beach Harbor will be an important factor in the harboring of ocean-going vessels when the port of call is opened to ocean traffic.

Kelsey City Ocean Beach

There cannot be found a finer beach on the Atlantic Ocean than that lying in front of the city and forming a part of the civic scheme. In the lake is Munyon Island, and from Kelsey City at the northern terminus of First street a causeway will be built over to and across this beautiful island to the Ocean Beach, and a hard-surfaced Ocean Boulevard constructed along Kelsey City Ocean Boulevard. The ocean fronting property is like that of Palm Beach, having a wealth of jungleland, tropic growth, and lends itself to the most attractive and imposing areas for luxuriant estates and palatial residences, characteristic of Palm Beach, which lies just a span to the south of Kelsey City.

Golfing and Fishing

At Kelsey City one may enjoy fresh-water fishing and the wild sport of Ocean catches. In the lake are seatrout, bass and bluefish in abundance, and in and around the canals black bass, bream and other fresh-water fish.

There are about sixty thousand acres owned by the corporation of the richest muck land, sandy loams and agricultural soils. This is a magnificent and valuable area supporting the "Miracle City" of the East Coast of Florida.

When in the Palm Beaches visit Kelsey City and tarry there, enjoying all the pleasing and inspiring things one sees in Kelsey City.

For illustrated literature, maps and plats of Kelsey, write to the EAST COAST FINANCE CORPORATION, Harry S. Kelsey, President; William H. Hansen, Sales Manager; Sales Office, 216 Clematis Avenue; Executive Offices, 119½ North Olive Street, West Palm Beach, Florida.

A TWO-STORY SPANISH TYPE RESIDENCE AT KELSEY CITY

Alabama Power Company Shows Amazing Growth

Connected Load Grows from 6,500 to 460,000 Horsepower in Eleven Years— Huge Construction Program Necessary to Keep Pace with Demands for Service

WHEN a lone Alabamian, poor in worldly goods but rich in foresight and determination, stood upon the rugged hills of his native state and listened to the song of the rushing waters below, he had a vision of a great industrial empire growing out of man's ability to dam those streams and put wasted energy to work. Today that lone Alabamian lives to enjoy a realization of his vision, for Alabama has made tremendous strides in industrial progress and is destined to become the leader, for which a very large share of the credit is due to a dream and the determination of the dreamer to convert a song of idleness into a song of labor.

The story of Alabama Power Company reads like fiction. It is romantic. It is a romance of successful business and industrial development that is unparalleled. It is nigh unbelievable. The vision of men, the fortunes of the rich, the savings of widows and others in every walk in life, the loyalty of employes and a new-born public sentiment are woven into that story. To visualize the remarkable and almost incredible progress of Alabama Power Company is impossible through printer's ink — one has to see to appreciate what it all means.

MITCHELL DAM, COOSA RIVER, PRESENT CAPACITY 72,000 H. P. ULTIMATE CAPACITY 120,000 H. P.

Dam 1264 feet long and 70 feet high. Each unit is housed in a separate compartment on the upstream side of the dam, there being no power house of the conventional type

The remarkable part of the story is that it tells of developments and attendant results one very naturally would expect to cover a period of many years, and not the eleven years which have elapsed since Alabama Power Company began functioning as a unified system.

Twelve years ago the Company had a name and very little else; the next year (1913) it had five customers—three municipalities, a brick plant and a cement plant—all of which consumed only 6,500 horsepower of energy.

Today, Alabama Power Company is fourteenth in point of power production in the United States, and has a connected load of 460,000 horsepower. It supplies an essential service to more than 26,000 square miles of territory, with a population estimated at over 1,000,000 people, and employs nearly 3,000 men and women in its operating and construction departments.

The Company was organized in 1906 by citizens of Gadsden, Ala., and chartered under the laws of that state on December 4, 1906, with a capitalization of $5,000. Failing to interest sufficient local capital with which to carry out its initial development, the promoters, after much effort, succeeded in attracting the attention and interest of London capitalists, who saw the wonderful possibilities Alabamians had failed to see. Through the efforts of James Mitchell, Sperling & Co., of London, arranged the early financing of the company, and the Alabama Traction, Light & Power Co., Ltd., was organized, with headquarters at Montreal, Canada, for this purpose. The construction of Lock 12 was begun in 1912, but before it was completed the World War began, and as a result future financing was confined to America. With about 85 per cent of its securities held by Americans, the Southeastern Power & Light Co., recently organized in the United States, took over the holdings of the Montreal concern, thereby placing the affairs of the company entirely in American hands. With more than ten thousand Alabama citizens owning the company's securities, and the parent organization being in the United States, Alabama Power Company is now a home organization in every sense of the word.

Coming into a field of tremendous industrial and agricultural possibilities, but severely handicapped by lack of central-station power service, Alabama Power Company feels that it has been of distinct service in making electric light and power available to the homes and industries throughout practically this entire area, at rates representing in most instances decreases of 16 per cent to 55 per cent in the case of lighting, and great reductions in the case of power, and, in addition, supplying dependable 24-hour service in place of intermittent service of only a few hours a day in many communities.

Generating Stations

The generating plants of the company consist of two of the largest and most modern hydro-electric stations in the South, Lock 12 and Mitchell Dam, on the Coosa River; and smaller hydro-electric stations at Upper Tallassee and at Lower Tallassee, on the Tallapoosa River, and at Jackson Shoals, on Choccolocco Creek; modern steam electric stations at Gorgas, Gadsden and Montgomery, and

CHEROKEE BLUFFS DEVELOPMENT, ON THE TALLAPOOSA RIVER, UNDER CONSTRUCTION.
The dam will develop 180,000 horsepower, and will be 150 feet high, impounding 60 billion cubic feet of water in a reservoir 40,000 acres in area. It is one of six power developments which will be made by the Company on this river at an estimated cost of $39,000,000.

nine smaller steam stations. The capacity of its hydro-plants totals 203,000 horsepower, and its steam plants 232,700 horsepower.

Sub-stations

The transforming stations of the company are twenty in number, totalling 472,600 k.v.a. in capacity, and are located at: Jackson Shoals, Lock 12, Magella, Gadsden, Anniston, Sylacauga, Warrior, Bessemer, Huntsville, Muscle Shoals, Mitchell Dam, Leeds, Fulton Springs, Waco, North Auburn, Upper Tallassee, Lower Tallassee, Cherokee, Albertville and Lewisburg.

Transmission Lines

The main transmission lines of the company are operated at 110,000 volts and connect the generating stations to the twenty primary sub-stations. From the primary sub-stations distribution lines at 44,000 and 22,000 volts radiate to supply towns and industries throughout the territory served.

Transmission and distribution lines now in operation aggregate 2,250 miles in length.

MAGELLA PRIMARY SUB-STATION, NEAR BIRMINGHAM
One of the Company's 20 high tension transforming stations, totalling 472,600 K.V.A. in capacity

Territory Served and Business Field

Alabama Power Company furnishes power service, directly or indirectly, to the major part of the urban districts of central and northern Alabama. Ninety-two cities and towns are served directly or indirectly, while the industries served through the company's wholesale division are 273 in number and comprise a wide variety, including coal mines, cotton mills, cotton gins, oil mills, graphite plants, brick plants, cement plants, quarries, iron ore mines, steel plants, rolling mills, foundries, machine shops, ice plants, public utilities and electric furnace installations making steel castings, ferro-alloys, phosphoric acid, concentrated fertilizers, and other electric furnace products.

In addition to the territory now served, the natural business field of the Company may be said to include the state of Mississippi and parts of Louisiana and western Tennessee, because of the fact that no water-powers of any consequence are to be found south and west of the so-called "Fall Line"—which extends through Columbus, Ga.; Wetumpka, Tus-

LOCK 12 DEVELOPMENT, COOSA RIVER, CAPACITY 110,000 HORSEPOWER.
Power House 323 feet long, 103 feet wide, 140 feet high. Dam 1,250 feet long, 70 feet high.

WARRIOR RESERVE STEAM PLANT, AT GORGAS, ON THE WARRIOR RIVER, 100,000 HORSEPOWER.
The largest steam power plant in the South. The coal supply is obtained within a few hundred feet of the boiler doors.

caloosa and Muscle Shoals, Ala.; northward through Nashville, Tenn.; Louisville, Ky.; Keokuk, Iowa, and southward through Little Rock, Ark., and northern Texas.

The favorable position of the company is further enhanced by its ability to operate large economical reserve steam stations at strategic points in the 8,400 square miles of Alabama's coal areas to supplement the output of its hydro-electric plants, and to relieve power shortages not only in Alabama but in the entire Southeast.

The Company also operates gas plants and distribution systems in the towns of Albany, Anniston, Montgomery, Selma and Tuscaloosa; and street railway systems in Tuscaloosa, Montgomery, Anniston, Alabama City, Gadsden, Attalla and Huntsville.

Industrial Development

Alabama has many advantages for the location of new industries and is rapidly becoming the manufacturing center of the South. In order, therefore, to bring the natural advantages and power resources of the state to the attention of other sections, the company has developed employes trained in the location of industries whose duties are to promote such development. An industrial survey of a large portion of the state has been made, and information gathered concerning health conditions, population, transportation, water supply, labor, housing, educational and religious conditions and other essential data. These employes keep in constant touch with various communities of the state as well as with industries which they are endeavoring to locate here. The activity is supported by a national advertising campaign, carried on by the company, presenting advantages of the state in a number of important technical and trade journals.

To further assist in its program of advertising Alabama's natural resources and advantages, the company has completed several one-reel motion pictures, which have been shown, not only in Alabama but throughout the country, to advertise the existing resources and industries of the state and the opportunities offered for further development.

Space is engaged by the company for national expositions, such as the Southern Exposition, National Exposition of Chemical Industries, and National Exposition of Power and Mechanical Engineering, held at New York, and the International Textile Exposition, held at Boston, at which Alabama's power resources, raw materials and semi-finished products are exhibited wherever opportunity exists for the profitable establishment of new industries.

(LEFT) GADSDEN RESERVE STEAM PLANT, NEAR GADSDEN, ON THE COOSA RIVER, 15,000 HORSEPOWER CAPACITY.
(RIGHT) SHEFFIELD STEAM PLANT, NEAR MUSCLE SHOALS, 80,000 HORSEPOWER CAPACITY.

Leased by Alabama Power Company from United States Government and operated as a part of the Southern super-power system for three successive dry seasons to relieve power shortages in Georgia and the Carolinas. Total rental paid Government to October 1, 1924, was $521,762.80.

How the South "Exports" Investments

The remarkable change in the manner of raising capital for Southern enterprises, as shown in the work of G. L. Miller & Co.—A dramatic story of how the Northern investment markets were successfully "invaded"

THE South has become a great exporter of finished investments, contrasting with the raw materials of investments which, until a score of years ago, were the principal financial exports of this section. It is important that every Southern citizen should realize just what this statement means if he would obtain a true picture of the South's progress in this vast field of finance.

Finished investments, in the somewhat figurative sense here used, are bonds of private corporations and individuals, as distinguished from the stock of corporations or titles to property. Ever since the Civil War there has been a steadily increasing amount of such stock certificates and titles to Southern property, held by manufacturers, capitalists and business men in other parts of the country, who have shrewdly foreseen the enormous development of business enterprise south of Mason and Dixon's line. Cotton mills built and operated in Southern states by Northern companies illustrate the point. Shares of stock and tiles to property carry ownership and control, which were thus removed from Southern hands. Carried to its extreme, such foreign ownership would have created a condition of absentee landlordism which would have been harmful to the South's economic growth.

Henry Grady Annex and Mansion Site Properties
Atlanta, Ga.

These exported stocks and title deeds are the raw materials of investment, depending for their success upon the resources, management and skill of outside holders—just as the South's cotton, iron and other natural products are raw materials which, when shipped North, are made up into finished products by the purchasers. Southern bonds are here classed as finished investment products because they leave the ownership and control of Southern property in Southern hands. Native enterprise and management reap the reward to which they are entitled after the interest on the bonds is paid.

Just as it was an achievement of the first magnitude when native skill began to turn the South's raw cotton and iron into finished goods, instead of merely shipping out the raw materials, so the export to other sections of Southern investment bonds marks an epoch in the South's development. Instead of selling title to property in return for cash, the South is selling its faith and credit in the shape of bond obligations, backed by the national standing and reputation of Southern investment institutions.

It was inevitable that one of the chief items in this growing volume of investment exports should be first mortgage real estate bonds. There were, and are, two great buyers of Southern mortgage securities—the great insurance companies, which are among the keenest judges of investment securities in the world, and the so-called "small investor," who is often a better judge of investments than he is given credit for being and who, on the whole, was familiar with the strong points of first mortgages.

A recent study of the investments of life insurance companies, made by G. L. Miller & Co. of Atlanta, showed that these companies held a total of $390,000,000 first mortgages secured by property in the South and Southwest — a larger total than that for any other region except the Northwest. The average interest return on the Southern mortgages was 6.24 per cent and that on the Southwestern mortgages was 6.48 per cent. Mr. Haley Fiske, president of the Metropolitan Life Insurance Company of New York, has laid down the rule by which the insurance companies guide their investments of policyholders' funds. He says: "Safety first, income next. Wherever the returns are highest on sound securities, there should the investment be made, irrespective of locality."

This combination of liberal rate and sound security which the South offers is the foundation on which the South's export of first mortgage real estate bonds is built. Few other sections in the United States, if any, offer such advantages. The old, well settled and wealthy regions offer undoubted safety, but the rate of interest is low because of the abundance of capital available. The new, relatively unsettled sections offer as high a rate as the South, or higher, but the economic life and development of these sections has not progressed to a point where the investor feels assured of stability and safety for his

money. Thus the South possessed a strategic opportunity for popularizing its first mortgage securities throughout the entire length and breadth of the United States.

Among the first Southern investment houses which saw and seized this opportunity was G. L. Miller & Co., with headquarters in Atlanta. This concern had been founded by Mr. G. L. Miller in Miami, Fla., nearly two decades ago. The company's first sales were Miami mortgages, which were bought by winter visitors and tourists in Miami. Under Mr. Miller's vigorous but conservative management, the company gradually established a reputation, and its business grew. With a vision of bigger things, the company was reorganized and moved to Atlanta. There it began to underwrite, under the careful and rigid safeguards of the "Miller Plan," mortgage bond issues secured by hotels, apartments and other income-earning properties in Atlanta. Soon offices were opened in Knoxville and Memphis.

The company's growth was so solid and substantial that two years ago it was determined to "invade" the North — a step which was only taken after the most careful consideration. While a few Southern investment firms dealing in miscellaneous securities had established Northern connections, and had even opened small offices in Northern cities, no house whose sole business was to underwrite and sell Southern first mortgage bonds had ever had the hardihood to establish New York headquarters. It was fully realized that the company was attempting to break into a very select and exclusive group, and that it would be necessary from the outset to obtain the whole-hearted support of investors. These considerations weighed heavily with the company's executives, but on the other hand it was impossible to ignore the growing volume of its business in the North, the product of careful advertising and scrupulous investment service.

Stoneleigh Court Apt. Hotel
Dallas, Texas

The decision was made. An office was opened on 42d street, New York City, in the heart of the "up-town" financial district. A branch of the National City Bank, the largest in the country, was just across the street. To east and west, north and south were the offices of the great banks and trust companies. The wealth and pageantry of Fifth avenue lay just a block to the west. A rich field, indeed, if it could be conquered!

Almost at once it was apparent that the venture would be successful. The volume of sales began to mount in a most gratifying way. The company began to make an impression on the conservative financial markets of New York. As opportunity offered for prudent expansion, offices were established in other cities. Philadelphia and St. Louis were among the first, then Pittsburgh, Buffalo, Rochester and Baltimore. Representatives were appointed in Albany, Scranton, Reading, Grand Rapids, New Haven, Hartford and numerous other commercial and industrial cities. Today the company occupies a unique position as the South's most powerful outpost in the great financial markets of the North, and annually brings millions of dollars southward to be spent for labor and material necessary to erect scores of large structures.

Advertising has always played a leading part in the program of G. L. Miller & Co. Southern first mortgage bonds are distinctly an advertisable product. Before the company opened its Northern offices it published a series of experimental advertisements in Northern newspapers, with gratifying results. The advertising of a conservative investment, however, is surrounded with difficulties. Traditionally, the advertising of the great bond houses has been restrained and dignified in the extreme. This has been due largely to the fact that such houses make no appeal to the small investor, but confine their offerings to the substantial buyer, including other banking houses and individuals who are apt to be already customers of the firm. Such advertising is ill adapted to the building up of an investment business starting out in a small way, without salesmen, without lists of customers and "prospects," without established prestige. The first requirement is to obtain customers, and these must be obtained by advertisements having sufficient human appeal to awaken interest and excite action. At the same time, the advertisements must avoid suspicion of cheapness and sensationalism, which, even if successful for a time, would handicap the house in its progress toward dignity and power.

The advertising of G. L. Miller & Co. has gone through three distinct stages, corresponding with the general character of the business. First, small advertisements were used in weekly and monthly magazines, with the purpose of obtaining inquiries and making sales by mail. The company had no personal representatives, and it was necessary to make the literature and letters which the company sent out extremely convincing, persuasive and sincere. Selling investments by mail—that is, legitimate investments—is one of the most difficult tasks which the advertiser can undertake. Nevertheless, G. L. Miller & Co. managed to inject into their letters and "copy" an element which brought responses on an increasing scale.

Second, with the opening of sales offices in various cities and the employment of salesmen, it became necessary to support the efforts of these salesmen and obtain prospects

in the various localities where offices were situated. For this purpose local newspaper advertising was naturally most effective. While magazine advertising has been continued with full vigor, newspaper advertising has assumed a constantly increasing role in the company's efforts.

Finally, the growing reputation of the house has called for two specialized kinds of effort: the advertising of G. L. Miller & Co. itself as an institution and, as a corollary, the introduction of Miller bonds through advertising to investors of substantial means, who until recently had largely excluded first mortgage bonds of all kinds from their holdings. To accomplish the first of these two results, advertisements of considerable size and as attractive appearance and content as could be devised were employed. There were two divisions of this campaign, also: "Southern Prestige" (so-called), intended to tell the South about its own development and the part G. L. Miller & Co. are playing in that development, and "Northern Prestige," designed to strengthen the position of the company among substantial investors in the Northern markets.

Institutional advertising of this sort does not, as a rule, carry a strong and immediate selling appeal. Hence, a direct attack is now being made on the big investor, showing him that Miller first mortgage bonds are actually being bought in large amounts by people of means, and pointing out to him the advantage of holding such bonds as a "safety reserve investment fund," something wholly apart from the risks of his own business and from the daily fluctuations of the stock and bond market. The advertisements employed in this campaign are illustrated by the best commercial artists obtainable. "Big business men" are pictured—not the conventional, poorly drawn type of banker or financier, but living, breathing persons, whom any man of affairs would instantly recognize as belonging to his own class.

An increasing amount of Miller bonds is being sold in the South itself. Offices are maintained at Atlanta, Memphis and Knoxville, with representatives in numerous other cities. The great bulk of the company's sales, however, is in the North, East and middle West, while the bonds it underwrites are created chiefly in the South. The company, therefore, is in the strategic position of an army which has thrown out expeditionary columns and must keep open its lines of communications with its base of supplies. The base of supplies of G. L. Miller & Co. is the South. Hence the company carries on an active work in this section, not only through its loan department and its increasingly important sales force in Southern cities, but through contact with bankers and business men, co-operation in Southern enterprises and in similar ways. Considerable difficulties are encountered from time to time in this field. For instance, several Southern states have statutes limiting the rate of interest to be paid by borrowers to 6 per cent. In practice, this restriction fails to operate in the first mortgage bond field, for 6 per cent bonds are merely sold below par, to yield the prevailing investment rate on such securities. The Southern borrower has to pay the difference—a hardship he should not be burdened with.

It happens, however, that the buyers of first mortgage bonds are averse to buying bonds on this basis. They like to pay par and get the full return in the semi-annual coupons. Hence, the volume of 6 per cent coupon bonds that can be sold is limited. Because of this, the lending operations of G. L. Miller & Co. in some of the leading industrial states of the South have been curtailed. The company wishes its bond issues to be representative of the entire South, and evidently it is to the advantage of every state to encourage the influx of outside capital. It would seem that the interests of the small, individual borrower could be fully protected by restricting the rate charged to individuals to 6 per cent, but allowing corporations to pay the prevailing rate.

Why should the South be interested in the enterprise represented by G. L. Miller & Co.? The answer is that the company is making three distinct contributions to the South. It is financing necessary hotels, apartment structures and business buildings in Southern cities. It is providing a safe, conservative home investment for the Southern people, thus encouraging the practice of thrift and spreading investment information. And, finally, it is annually putting millions of dollars in cash into Southern banks, every dollar of which serves as a basis for ten dollars of bank credit, to be extended to Southern borrowers. There are few enterprises which play such a multiform role in the upbuilding of the South.

Typical Southern Buildings Financed and Constructed Under the Miller Plan

Redmont Hotel
Birmingham, Ala.

Office Building
103 Marietta St., Atlanta, Ga.

Henrietta Apt. Hotel
Miami, Fla.

A Scientific Dairy Sets Pace for Country

The Story of the Western Maryland Dairy of Baltimore Reads Like a Romance of Progress, of Science, of Health Protection in Safeguarding the City's Milk Supply—An Example and an Inspiration to Every Dairyman in the Country

NO MATTER what time the sun rises, it finds "the milkman" at work in every city, visiting thousands upon thousands of homes. At each, he leaves a pint or quart, or more, of milk, and at a large percentage he leaves cream. The householder takes it in as a matter of course, without thought of whence it comes or how it gets there.

Behind the milk bottle is the story of a great industry, engaging the activity and brains of many thousands of men and women, and the service of literally millions of cows. Involved in the industry are intricate branches of science—chemistry and physics, medicine and mechanics. Its ramifications are almost boundless, and on it depends the daily bread of men and women in hundreds of other occupations. Billions of dollars in capital are at stake, invested in farm lands and city property, in cows and horses, in factories and automobiles and a wide variety of other items. Hundreds of millions of dollars of salaries and wages depend on the dairy industry, and, above all, human life and health trust reliantly on the honesty and efficiency with which every detail is managed.

But, where does the milk come from which the householder finds on his doorstep all ready for his breakfast, and how does it get there?

It comes, in the first place, from 23,000,000 cows on about 5,000,000 farms throughout the land. It travels, on the second stretch, over highways or railroads to great dairies in the cities.

As the latest census report, for 1920, puts it, 19,600,000 cows of that year produced 6,893,727,418 gallons of milk, which was sold for $717,380,222. There were produced 1,628,216,558 pounds of butter, which brought $106,973,742, and $111,905,929 worth of cream, not to mention cheese and cottage cheese and butterfat and buttermilk. Much went into ice cream and bread and pastry and other kinds of food. Milk also is used for manufacturing purposes in a wide variety of articles.

Incidentally, the 16 Southern States showed about 29 per cent of the total of dairy cows, 19 per cent of the milk production, 8 per cent of the cash receipts for milk sold, 25 per cent of the butter produced, 30 per cent of its sales price, and 15 per cent of the value of all the cream sold.

So closely related to their health and comfort is the dairy industry that the people should know something about it—should know the story bottled up with the milk on their doorsteps, and the wonderful experiences their milk undergoes from the time it leaves the cow till it goes on the table. Many a great dairy, like the Western Maryland Dairy in Baltimore, gladly welcomes visitors and sends guides with them through the plants to explain and to answer questions. Were such visitors more numerous, it may confidently be said, the consumption of milk would be much greater. This story of the Western Maryland Dairy is the outcome of a recent visit of a large delegation of women, including some women physicians, and so deeply impressed were these visitors with the scientific methods of the dairy that one of the physicians in the party told so interestingly of their inspection that out of her story grew the thought of this article, on the theory that the methods of such an enterprise should, for the good of the people and the inspiration to other dairymen, be made as widely known as possible.

As in all other great industries, there are two fundamental factors in the dairy enterprise: The producing end and the distributing end. In the dairy business, however, these originating and delivery ends are probably more closely related than in any other industry; they are bound together by the factors of health and efficiency for the consumer, who unhesitatingly trusts them to a degree scarcely known in any other great business enterprise.

The milk consumer buys more than milk. He pays an infinitesimal sum for a conscientiousness in production and distribution that may mean to him his very life or the life of the little one far more dear to him than his own. He accepts without question a confirmed belief that the farmer keeps high-class, healthy cows and maintains 100 per cent cleanliness. Of the dairy in the city he

DAIRYING AN INDUSTRY

THE cow is the greatest blessing known to man.

She turns out finished products of tremendous worth in money and in health and strength to mankind and the soil.

There are 23,000,000 cows in the United States annually producing foodstuffs which aggregate billions of dollars in money value and untold billions of worth in the health of the people.

Wherever the cow is introduced and is given proper care, farming of the highest type develops; fine barns and bins and silos arise, and supplementary factories, which never close down but yield steady income throughout the year. From the industry of the cow are constructed comfortable farm homes, with all modern improvements and conveniences—the homes of prosperous, contented people, the backbone of the finest citizenry.

The modern dairy, properly operated, is second to no great business enterprise in efficiency, in scientific advancement and in mechanical ingenuity.

Receiving the finished product from the cow, the dairy prepares it with marvelous care for distribution, and delivers it to the consumer as near 100 per cent perfect in purity and healthfulness as is possible with any commodity used by man.

A modern dairy, conscientiously managed by expert operators, is the asset of greatest value to any city. Through it flows to the people a mighty stream of health and vitality which generates a power of brain and manual strength upon which depends the life of the community. Industry, education and religion flourish, and these are the foundation of all prosperity.

takes for granted the careful examination of the farmer's milk and the use of the most modern methods of pasteurization and handling. And yet this confidence may be misplaced unless the milk buyer makes certain that he gets his milk only from a dairy which stands pre-eminent for scientific methods and care.

To assure in the industry the nearest approach possible to perfection, the farmer and the city dairyman keep in close touch, frequently visiting each other to interchange observations and suggestions, and to assure themselves that each is measuring fully up to the standard which they jointly are endeavoring to maintain.

In consideration of the dairy business in its modern development, it must be divided into two parts—the production end, or farm, and the distributing end, or dairy in the city. The farm, of course, comes first.

Typical of farms today is the farm divided into woodland and meadow and fields and orchard, with dairying the predominant industry. In the center of a grove of trees one sees a comfortable farm home, with improvements and conveniences, and nearby are the springhouse and other buildings.

In fine pasture are the dairy cows, showing evidence of a happy and contented life.

Just far enough from the farmhouse to be entirely distinct and separate, yet near enough to be convenient, stands the cow barn. At one corner of the cowhouse stands a great silo, from which healthful, nourishing food is supplied to the cows throughout the winter. There is nothing equal to the silo, says the dairyman, for furnishing succulent feed to take the place of pasture and to furnish feed for the winter months.

On the farm the cows are cleaned and curried every day. Before milking, the men, too, enjoy a thorough "wash-up." Face, hands and arms are cleaned, and nothing contaminating is touched till the entire milking task is completed. Also, the pails receive earnest attention; each receptacle is scoured with boiling water and permitted to dry in clean air, while the cans get a supplementary cleaning, in addition to the sterilizing they have undergone at the dairy in the city, after having been emptied there of their contents.

Dairy farms today measure up to the highest standard of cleanliness. They co-operate in every way with the Health Board. A visit to a farm adjacent to Baltimore will disclose a notice hanging in the milkroom from the Baltimore Board of Health reading as follows:

NOTICE FROM BALTIMORE CITY HEALTH DEPARTMENT

Warm weather is here! Look out for high bacterial counts in your milk!

(1) *Wash thoroughly;* then, just before milking, *scald with boiling water* all *cans, pails, strainer, holders and other utensils.*

(2) *Cool your milk at once* and *keep it cold as possible* until received by truck or train.

(3) *Do not hold over any milk.* Morning's milk must not be held over until the next day. Milk left over must not be shipped or mixed with night's milk.

Follow these rules all the time and produce good milk. Unsatisfactory milk will be excluded by the Health Department or returned by the dairy.

Get it clean and keep it cold!

From 1856 of these farms the Western Maryland Dairy draws its milk supply and employs two inspectors, who devote their time to frequent inspection of every farm. These men observe closely the cleanliness of the cows, the farm hands, the dairy apparatus, the cans and other implements. They watch for the slightest sign of sickness in the cattle and other animals on the place. These inspectors are experts in their line.

Probably in no other industry is the producing end more absolutely dependent on the distributing end for success than in the dairy business. Certainly, in no other industry is the consumer so confidently dependent on the distributor for the protection of health. Even city health departments, in some places, rely on the dairies for leadership, and a great dairy, properly managed, is a municipal institution.

As Baltimore is described by authorities as having "the best milk record of any city in the land" in low bacteria count in the milk and high butterfat content, a dairy in that city may be cited as a concrete sample of the most modern methods in the efficient, scientific and sanitary handling of milk on its course from the farm to the consumer. Indeed, the Western Maryland Dairy in Baltimore is held up by experts as a model of what a perfect dairy should be.

The Western Maryland Dairy was established 35 years ago by Irvin D. Baxter with one horse and one wagon and half a dozen cans. It now has 642 employes. In 1923 its business ran to more than six million dollars, and the modest horse and wagon had increased to a fleet of 230 wagons, with 262 horses and 54 auto trucks.

How has this been accomplished? one inquires. By keeping not merely abreast of the times, but even one or two jumps ahead, is the answer. Not only is the purity of the milk assured, but new ways and means are constantly sought to receive it pure, to keep it pure and to distribute it pure. The mere mechanical factors of horses and wagons and trucks in the distribution process are important, but of secondary consideration.

So, from the receipt of a few gallons of milk daily from a few farms in the counties, in 1889, the Western Maryland Dairy now handles nearly 12,000,000 gallons a year—8,760,000 gallons retail and 2,873,442 wholesale was the record for 1923.

The half-dozen farmers who at the outset furnished the supply have increased to a regiment of 1856.

Twenty-six thousand cows now produce milk for this dairy, whereas a score once sufficed.

Finally, the hundred or so dollars invested originally in the business have swollen to a plant valued at $1,125,000, in the heart of one of the great cities of the land, and with local and rural stations.

As it stands today the Western Maryland Dairy is a merger of two great dairy enterprises, consolidation hav-

ing been effected, about three years ago, by the absorption of the City Dairy. Irvin D. Baxter is chairman of the board; Asa Bird Gardiner, former head of the Gardiner Dairy, is president; Oscar B. Schier of the old Hygeia Dairy is vice-president, and Hartman K. Harrison, once of the Pikesville Dairy, is vice-president and secretary—practical dairymen, all, who have devoted their entire lives to the dairy industry.

Odd as it may sound to some, the modern dairy, such as the Western Maryland, is a vast hive of machinery that performs a thousand operations with a precision and thoroughness hardly possible to human hands. Steam generated by great boilers operates huge mechanisms which provide the electric power to run the entire plant—a group of nearly 100 motors. Yet all operations are arranged with such care and precaution that the milk is safeguarded at every step of the process.

The engine-room in the Western Maryland Dairy is described by experts as one of the finest in the land, and probably the most complete and efficient in its particular line. Over $400,000 is invested throughout the plant, and the early construction of additional thermos tanks and other dairy equipment will necessitate further heavy outlay. Engines run the many endless-chain conveyor systems by which cans and boxes and bottles are moved from one end of the plant to the other, performing the work of scores of strong men. Ice-making machinery turns out nearly 100 tons every 24 hours, besides refrigerating the temporary storage-room and the receiving or thermos tanks, each with a capacity of 1000 gallons or more—at present, there are 12 such tanks and six more are soon to be installed. Heat necessary for the pasteurizing process is provided by steam, which also furnishes scalding water for almost continuous washing of the plant and every inch of the machinery.

Transported to the city by train or truck, the milk is delivered at the receiving platforms of the Western Maryland Dairy at Linden avenue and Dolphin street. The receiving platform is a huge, partly elevated shed, divided into three receiving sections, each equipped with a force of men experienced in their respective lines. As each can is shifted from the truck to the platform it is first examined by the dairy inspector, who raises the lid to find out if the milk measures up to standard. At the same time the cans are scanned for indentations, as only good cans are acceptable.

To the casual observer this preliminary inspection might seem almost perfunctory, whereas it is both important and thorough and is only the first step in a series of sanitary examinations, which include the milk, the cans, the tanks and coils through which it passes, the bottles into which it is poured, the boxes in which these are packed and even the health and domestic sanitary surroundings of the employes. Fully to realize and appreciate the care and preventive processes of the dairy, one should visit it and learn from observation.

ONE OF THE 1856 HERDS WHICH SUPPLY 28,000 GALLONS A DAY TO THE DAIRY

On the milk being approved by the first inspector, the cans from each individual farmer are segregated and started on the second lap of their course. Such milk as may be disapproved or even questioned is placed at one side on the platform for verification of the inspector's diagnosis, by experts in the dairy laboratory and from the City Health Department. Never is the milk given "the benefit of the doubt"; rather, it is held in abeyance till it proves that it measures up to the regular high standard.

The first stage takes the milk on a conveyor to the weighing tanks. Here the Dairy Inspectors as well as the City Health Department inspectors draw samples from each can for testing. As the milk in one of each pair of tanks is weighed and credited to the farmer's account, the other tank of the pair is emptying its con-

tents, already weighed, whereupon it is filled with a fresh supply and the twin tank is emptied in turn. The weight of the milk is dependent on the butterfat content, so that the farmer is paid rather for the quality of the milk than for the quantity.

After the milk is emptied in these tanks, the cans are passed back and scalded and sterilized by the dairy before being returned to the farmers. And right here it may be said that no article with which milk comes into contact escapes washing and scrubbing, scalding and sterilization.

From the weighing tanks the milk goes to the top floor, where it flows into a battery of 12 tanks, in reality great thermos bottles. This is an intermediate step between its reception and its actual introduction to the pasteurizing process. The milk remains in these tanks ready for the pasteurizing-room. The total capacity of these 12 tanks is 21,000 gallons—eight holding 2000 gallons apiece, two holding 1500 each and two containing 1000 gallons apiece. Each is glass lined and insulated, and in each great paddles stir the milk without cessation, so that the fats have no chance to rise to the surface. The tanks were installed by the Elyria Enamel Products Company of Elyria, Ohio.

From the thermos tanks the milk flows by gravity into the pasteurizing apparatus, where it is pasteurized.

This process is developed in a most remarkable manner and has now reached a high degree of perfection. It consists of surrounding the milk by steam, which heats it to a temperature of more than 140 degrees, and holding it at that temperature for more than thirty minutes. Then it is rapidly cooled to a temperature of 38 degrees, bottled, sealed and refrigerated.

As one views it from an adjacent platform, the pasteurizing apparatus is a series of tanks and of great coils, much like an enormous radiator set horizontally, rising apparently over 20 feet and over 20 feet in length. And over these coils pours an endless supply of milk, really a lacteal cascade, pure and clean and engaging to the eye. For, wonderful and scientific as it is, and marvelous in its results, the pasteurizing process in the Western Maryland Dairy is made an ingeniously simple affair.

The pasteurizing apparatus was furnished by E. A. Kaestner of Baltimore, and is said to be the most modern and efficient system in operation. Every part of the apparatus is subjected each day to thorough cleansing and sterilization, thousands of gallons of boiling water being used in this operation. The coils are so cunningly contrived that they are easily taken apart, and even the joints and connections are scalded and scrubbed, so that not a fraction of an inch of the interior or exterior escapes attention in the process. In fact, this cleansing and sterilizing

MAIN PLANT OF THE WESTERN MARYLAND DAIRY, AT LINDEN AVENUE AND DOLPHIN STREET, BALTIMORE

operation is practiced throughout the entire plant, not a square inch of surface or any piece of machinery being overlooked, while hose are constantly played on the floors and walls at all hours of the day—the walls, even, are constructed of a particular kind of brick which is specially adapted to such sterilizing treatment.

Fresh air, almost as essential in its way as cleanliness in the handling of milk, also is abundant in this building, while the sunlight illumines each department and adds health and cheer.

Cleanliness is also the first feature of the bottling system, but mechanical ingenuity and efficiency are close behind. First, the bottles are washed, scalded, scrubbed and sterilized; this process is repeated and repeated. Each bottles goes through 14 cleaning and sterilizing operations before it is considered ready for filling, and the purification process takes 25 minutes.

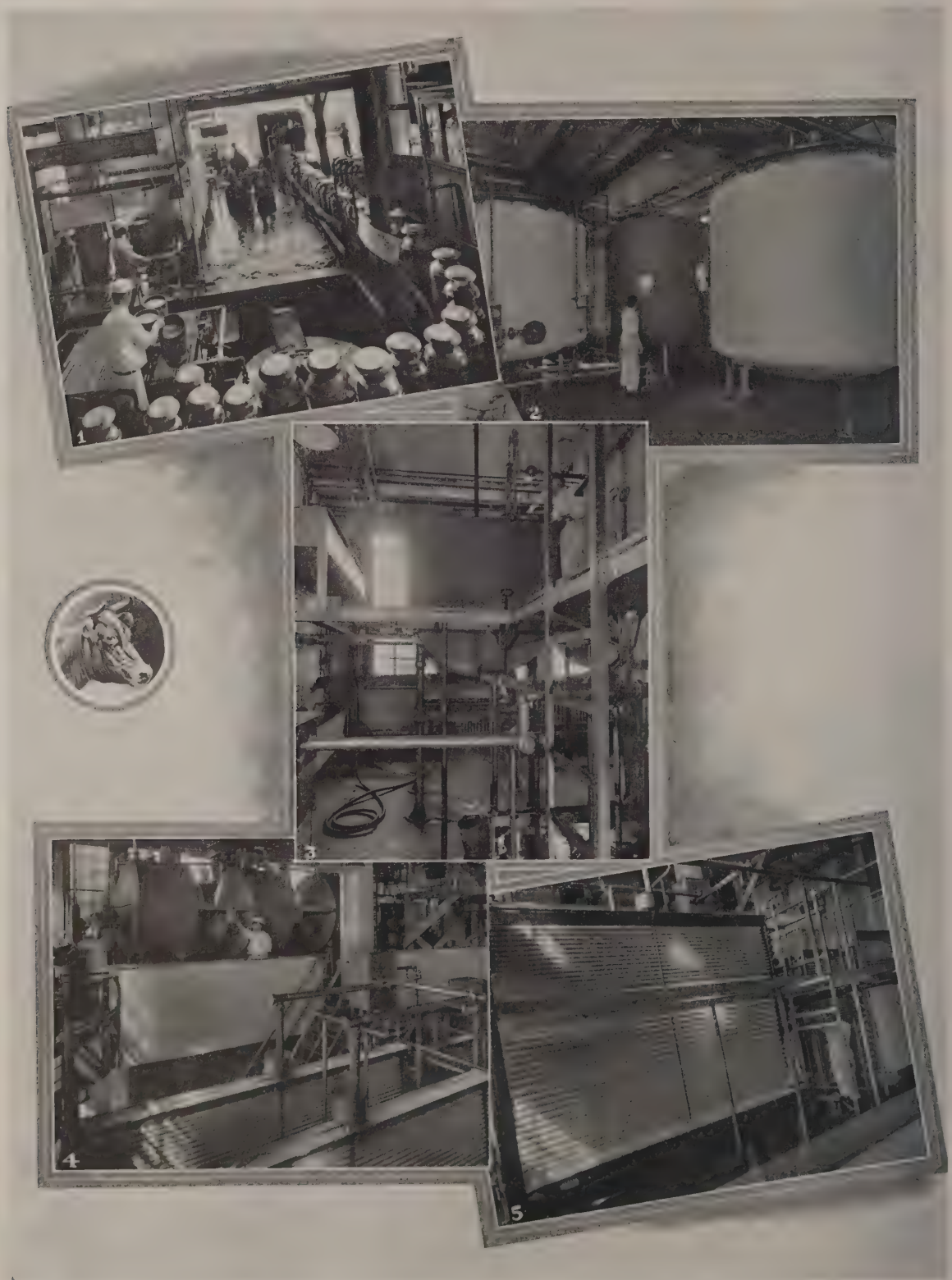
Huge batteries, like giant honeycombs, open before big platforms, and into these the bottles are inserted. A separate brush is inserted automatically into each bottle and scrubs and scrubs, while steam fills the bottle and loosens even the most minute particles of dirt. At the same time, the exterior is also thoroughly washed.

As the bottles are being purified, the wooden boxes in which they are to be packed undergo a washing. Each is separately scrubbed and steamed. The bottle washing machines were made by the George J. Meyer Manufacturing Company of Milwaukee, Wis.

In connection with the bottles, two points are conspicuous: For one thing, the loss of bottles through breakage and other causes is a tremendous item; also, some consumers are not addicted to cleanliness as strongly as is the dairy. The loss in breakage alone is said to run up to thousands of dollars a year, while the condition of many bottles necessitates probably 50 per cent of the 14 cleansing operations to which they are subjected. And such items undoubtedly must enter into the cost of the milk to the consumer.

From the washing machines the bottles go onto an endless-chain conveyor, and are carried to the filling and capping machines. Into these machines the milk in the meantime has been flowing from the pasteurizer and coolers. Then as the oncoming bottles move into position under the revolving fillers they are mechanically raised and a slight pressure causes the valves of the filling machines to open and fine pure milk flows into the shining bottles, almost to the point of overflow, when it is automatically cut off. Again, the layman marvels—he watches for milk to spill over the top of one of the countless bottles; he makes wagers with himself that the tap will mis-

CONSIDERED ONE OF THE MOST MODERN AND COMPLETE IN THE UNITED STATES



STEPS IN THE PROGRESS OF THE MILK THROUGH THE WESTERN MARYLAND DAIRY

1. Receiving, testing and weighing milk at incoming platform.
2. Three of twelve receiving thermos tanks, holding a total of 21,000 gallons.
3. Measuring tank, pasteurizing process.
4. Holding tanks in pasteurizing room.
5. Cascade of milk in course of cooling.

OPERATIONS IN THE WASHING, FILLING AND CAPPING OF BOTTLES, WITH TWO VIEWS OF THE ENGINE ROOM

6. Placing bottles in battery for first of fourteen cleansing operations.
7. Bottles, cleaned and sterilized, come from the giant washing machines.
8. Bottles, filled by automatic valves and capped by machine on attendant's right.
9. Glimpse of the engine room, from which nearly 100 motors are operated.
10. Compressors—only a part of the great equipment.

carry and will not turn off at the right instant. But the apparatus is apparently infallible and measures the correct amount to a drop.

Thus filled, the bottles fall into line in the endless procession of glassware and take places on still another section of the conveyor and go on to the capping heads. Long tubes of bottle caps are kept on each machine, and as each bottle passes one cap is brought down and is deftly

TRUCKS UNLOADING INCOMING MILK

inserted onto the bottle. The day of the week is printed on each cap for the information of the consumer and as a guarantee of freshness.

Then human hands partly replace machinery, and girls in immaculate white remove the bottles from the conveyor and place them in boxes, which also appear on conveyors. Not only do the girls pack the bottles, but they also watch for the slightest imperfection, and rewards are given by the dairy for skillful and efficient work in detecting anything amiss. The filling and capping machines were furnished by the Milwaukee Dairy Supply Manufacturing Company.

Comes the last trip on the conveyor as the boxes of filled bottles proceed to the refrigerating room, to be kept a short time before dis-

ONE OF THE COUNTRY CREAMERIES WHERE MILK IS RECEIVED

tribution and delivery. The refrigerating apparatus was installed by the York Manufacturing Company, York, Pa.

In another great coldroom of the dairy are stored supplies of butter and cottage cheese, which may be called side lines of the mammoth milk plant. The Western Maryland Dairy last year turned out 700,000 pounds of butter and 364,000 pounds of cottage cheese, and these commodities form an appreciable part of the business. This butter, by the way, is "heathized," this adjective being derived from the name of the inventor of the process, just as "harveyized" is applied to steel. Without going into the details of the operation, it may be said that, in churning, air is excluded from the cream, thus assuring the preservation of the vitamines necessary in all good butter and always found therein.

"The laboratory is the eye of the dairy," say the managers of the Western Maryland Company. The eye of this dairy never sleeps. In the first place, it is in charge of experts, and is equipped with the latest and most approved apparatus for testing the milk and other products, and even the bottles, cans and boxes.

First, the laboratory tests the milk as it reaches the receiving platform, and also verifies the rejections made at that point by the dairy inspectors. Each farmer's milk must measure up to the highest standard and must be maintained at that standard every day in the year, and the laboratory makes sure this is done.

In this process of determining the quality of the farmers' milk one one-hundredth of a cubic centimeter of milk is taken as a sample and subjected to the scientific tests. In lay language, a few drops are spread on a small slip, sufficient to cover about three-quarters of a square inch of surface, and this then is treated and placed under a microscope. The number of bacteria is counted and approved or disapproved, and all records are kept in a great card index for reference and comparisons. Incubators and refrigerators are important features in this testing-room, together with delicate scales which well may measure the weight of one human hair. Should a farmer protest that criticism of his milk is unfounded, he is called to the laboratory and given through the microscope visual

ARLINGTON (BALTIMORE) BRANCH OF WESTERN MARYLAND DAIRY

proof of the condition as disclosed by "the eye" of the great plant.

At this point reference again may be made to the effect of temperature on milk at various stages and the absolute necessity for regulating this at proper degrees. Not only does the Western Maryland Dairy insist that the farmers deliver their supply at a proper temperature, about 62 degrees, but before and after the pasteurizing process it regulates the temperature so that it is kept at just the proper figure.

Finally, as a precautionary measure, the Western Maryland Dairy recently obtained nearly 2000 thermometers for distribution among its supplying farmers, so that they can keep tabs on the temperature.

In the laboratory one is told that good milk is composed of 87.1 per cent water, 3.9 per cent fat, 2.5 per cent casein, .7 per cent albumen, 5.1 per cent sugar and .7 per cent ash. The law in Maryland insists that milk for dis-

TYPES OF HORSES AND MILK DELIVERY VEHICLES OF THE WESTERN MARYLAND DAIRY

1. Blue Ribbon winner, "Frank."
2. "Bud" and "Henry," Blue Ribbon team.
3. Monster milk transporting truck.
4. "Bud," "Henry" and "Sultan," Blue Ribbon trio.
5. Three specimens from the dairy stable of high-class horses.

tribution shall contain 3.6 per cent fat, but the milk used by the Western Maryland Dairy is said to average about 4 per cent.

Another eye which never sleeps in this dairy is the medical department, and the Western Maryland Dairy was the first dairy in the country to install such a bureau in direct, personal charge of a high-class physician and a trained nurse. The great work of this department is prevention. On applying for work, each man or woman is examined with most thorough care, and only those in sound health and with sanitary domestic surroundings are accepted in the plant. Each and every employe is examined physically at regular intervals and records are kept of their condition. Some persons, while in good health themselves, may carry with them the germ of some disease, and scrupulous care is taken in the examinations to discover any such case. Any employe found ill, or suspected of carrying any germ, or even one having illness in his family, is laid off till all possibility of contamination is past, and his pay is continued throughout the layoff, just as though he were on duty.

Beyond all this the physician and nurse take charge of any accident cases, and are competent to handle, in the medical department, all except major injuries. The rooms are equipped with ample apparatus of all kinds for such medical work.

Adjacent to the medical-rooms is a great assembly-room, in which staff meetings are held and which the dairy frequently loans to civic or charitable organizations.

One field, it appears, in which the auto cannot well supplant the horse is the delivery end of the dairy business. There the horse still reigns supreme. In the delivery of milk from house to house, the driver usually takes a dozen bottles and moves rapidly from door to door, and the horse follows him closely along his route and is on hand when a city block is finished. The horse learns the route and stopping places fully as well as does his driver, and when a new driver is substituted for the veteran in any section the horse actually leads the novice over the course and virtually teaches him how it should be covered. Not even a flivver has yet been designed to start and stop of its own volition and direct a new driver.

No horse-show exhibitor takes more pride in his horses and vehicles than does Mr. Baxter, and none gives them more affectionate attention. Indeed, this dairy has been prominent in horse shows in its section and has half a dozen blue-ribbon winners in its service. Housed in a stable convenient to the dairy, the horses enjoy the very finest kind of care. They are cleaned and curried daily and are given ample rest. The horses and their drivers are pals, and work with harmony and co-operation. On coming in from their rounds the horses are cooled and cleaned and watered and are given the best of feed. Each of the 262 animals knows his own stall and goes to it unguided, and some of them answer the whistle or call of their respective drivers, even though summoned from the ground floor of the building.

Similar attention and care are given to the wagons, of

ROOM IN THE MEDICAL DEPARTMENT

which are are 230 in service, and these are kept clean and sanitary.

To such extent does the pride of the dairy run in its horses and delivery system that it maintains its own harness shop, adjacent to the stables, and there makes its own harness. Sets of the highest type of workmanship are turned out, made of the finest leather in the market, and equipped with buckles and other metal work of the best material. The harnessmakers have the same pride in the appearance of the horses that the stablemen take in their welfare, and turn out the handsomest harness to be found in the land. It is said that the horses are proud of their trappings, and one who has seen them on parade is inclined to believe it.

For the care of the 54 auto trucks in the service the dairy has its own service station, convenient to the two

TWO LABORATORY ROOMS—ANALYTICAL ON THE LEFT; BACTERIOLOGICAL ON THE RIGHT

garages it occupies. This station is equipped with lathes and tools of all kinds for any and every kind of auto work, and it recently made a machine and crane to lift bodily a five-ton truck from the mire if ever one should become stalled. Every kind of mechanical operation, minor or major, is performed in this shop, and the emergency wagon is ready at any hour to play the rescue part, thus precluding delay in milk delivery by automobile or wagon.

The dairy also maintains its own carpenter shop, in charge of experienced men, and the work it does plays no small part in the success of the dairy operation.

In the thousand and one operations in the plant a tremendous amount of hot water, and of steam to generate electricity, is required — 8000 gallons of scalding water is needed daily for the cleaning of the pasteurizing apparatus alone. So a whole battery of boilers is required, and the dairy has three magnificent specimens. Two are of 150 horsepower each and one of 200 horsepower, housed in a large, convenient structure and equipped with most modern devices. Red and white lights connected with each warn the watchful engineer that a boiler or fire needs attention, or else is working at maximum efficiency, and a chart on the walls keeps uninterrupted record of pressure and other details in the work. The boilers were made by the Erie City Iron Works of Erie, Pa.

THE DAIRY MAKES ALL ITS OWN HARNESS

Exactly the same care in testing cream and assuring its purity and healthfulness is exercised by the Western Maryland Dairy as in handling its milk supply.

Local distribution of milk and cream, however, is by no means the sole activity of this dairy, for it also does a tremendous wholesale business, and above all it gives away a large amount of milk to the poor and needy of Baltimore.

Nearly 3,000,000 gallons of milk—2,873,442 gallons, to be exact—were sold wholesale by the Western Maryland Dairy last year, its territory extending throughout Maryland, into Delaware, Pennsylvania, New York and Virginia. Indeed, one of the greatest dairies in New York city obtains a great percentage of its supply from the Western Maryland. All wholesale milk for that section is ordered direct by the Western Maryland office in New York. The Baltimore division of the Walker-Gordon Laboratory has a fine office and laboratory-room in the Western Maryland Dairy plant and the Western Maryland Dairy is the Baltimore distributor for the Walker-Gordon products.

Such is a sample of the modern, model dairy — an asset of incalculable value to a community and a remunerative investment to the owners.

"A quart of milk a day" has become a health "slogan," but general consumption falls far short of that figure. With a population of approximately 800,000 people, Baltimore is estimated to drink about five-eighths of a pint daily, per capita, while figures recently disclosed by a Federal Government department show Detroit and several other cities running even lower than that average. No greater encouragement for milk drinking in Baltimore could be found than a visit to the Western Maryland Dairy, and "Welcome" is the greeting offered to all who care to visit it to see how the milk they drink is prepared and handled.

The people of Baltimore are peculiarly fortunate in having such a scientifically managed dairy, and the story of the Western Maryland should be studied by the health authorities and the dairy people of the entire country. It is an epic of an industry vitally important to health and life, and to agricultural prosperity and national progress.

IRVIN D. BAXTER
Chairman of the Board

ASA B. GARDINER
President

OSCAR B. SCHIER
Vice-President

HARTMAN K. HARRISON
Vice-President and Secretary

Shreveport Strives To

Excellent Living Conditions, Magnificent Influence In Development

By John W. Lewis, Jr., Publicity Manager

If the prosperity of a city may be judged by the number of well-built and desirably located homes it possesses, and by the ever-increasing business establishments, then Shreveport is prospering. For the year 1923 the total building permits amounted to the aggregate sum of $9,467,382. Never before in the history of this city has there been so much building of homes, business buildings and factories. Citizens of Shreveport have spent thousands of dollars for improvements in dwellings and business establishments.

Wonderful Place to Live

Primarily a city must offer to prospective citizens good living conditions. This is a prerequisite to good citizenship, progress and prosperity. There is no city which has built itself up from the ground floor that ever succeeded unless its living conditions were of the best. Many cities have grown and succeeded, in a measure, because of their natural locations, but the bulk of American cities grow and progress because of what they have to offer and because of what their citizens are doing for their uplift and betterment.

Fine Homes

In this magnificent city of the great Southwest there are no slums, and there is not a single square, plot of ground or suburb of which the people here are not proud to call a part of the city. Beautiful and modest residences greet the eye on every street, avenue and boulevard. The many expensive and elaborate homes are actual testimonials to the success of the big business interests, while the thousands of neat, modest and well-built dwellings are the barometer by which the industry and happiness of Shreveport's average citizen can be gauged. The natural beauty of the foliage and the trees in this city is a revelation, and the homes are built with a view of blending them with the natural beauty rather than to have them appear the essence of artificiality.

Law Enforcement

The city of Shreveport has one of the most enviable records of law enforcement in the South. Seldom is her name linked

Become the Ideal City

Homes, Industrial Possibilities Have Great Of Metropolis of Southwest

Chamber of Commerce, Shreveport, La.

with crimes of any character and at no time has she received the yellow publicity which heinous murders, organization clashes, religious disruption frequently afford. The home and religious influence, clean and moral surroundings and high-minded citizens as leaders afford the youths of this city a good beginning and an excellent example. Lawbreaking does not flourish here, for the seeds of crime fall upon barren soil. In no city are the needs of the children so carefully surveyed and attended to; practically every civic organization in this city has as a part of its program a project for the betterment of the moral, physical and intellectual welfare of the children.

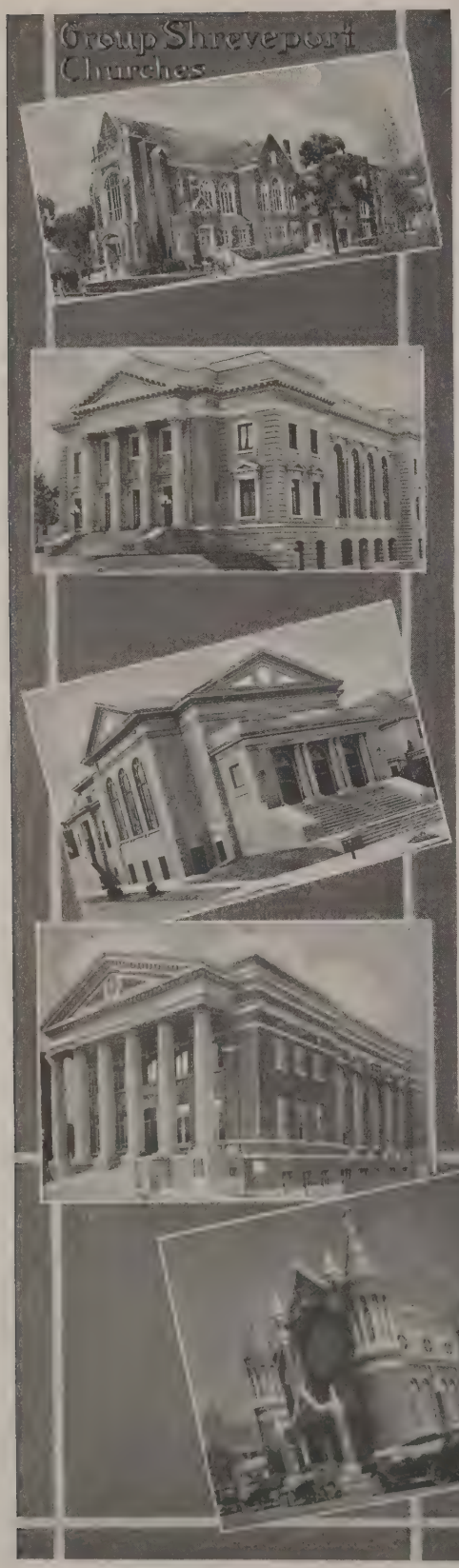
Sanitation

The sanitation laws of Shreveport are enforced as rigidly as possible, and because of the city's efficient Health Department you will find no epidemics here, with the possible exception of influenza, which ravaged the nation as a whole. But even diseases akin to influenza are almost entirely eliminated because of the mildness of the Louisiana winters and the sanitary condition of the city as a whole. Ample sewerage facilities, good, purified water and excellent drainage facilities provide a good beginning in the extirpation of disease. No weeds are allowed to grow here that might breed mosquitoes or other disease-carrying insects; stagnant water is quickly done away with as soon as it is detected, and residents must, under penalty for violation, follow the code of health. To these precautions and the effectual carrying out of the Health Department's plan is attributed the low death rate, which is only 12 per 1000 for both white and colored.

Hospitals

Shreveport has many modern hospitals and sanitariums and is recognized as one of the great medical centers of the Southwest.

In addition to the splendid modern sanitariums of the city, the North Louisiana Sanitarium has just been completed at a cost of $500,000 and the Tri-State Sanitarium will be com-



pleted within a short period. Shreveport has a large charity hospital, which serves in this respect, as it does in many others, a large territory, including oil and gas field towns and sawmill towns.

The Shrine Hospital for crippled children, the first of its kind built in the United States, has a staff of the leading physicians in the city and is doing a wonderful work.

The Pines, a sanitarium for tubercular patients, is also most successful. Since the sanitarium has been opened over six hundred patients have entered its door and over 80 per cent have been cured. All of this has been made possible through the devotion of those who conceived and who have carried through this splendid and necessary work.

Homes, Churches and Schools

With Shreveport's homes, churches, schools and hospitals, her climate, agricultural and mineral resources, she has every possibility to offer the homeseekers. Her schools have improved proportionately with her many other important factors. No money is spared to afford free education to the children by the splendid public-school system. With the recent erection of a million-dollar high school and the voting of a two million school-bond issue, Shreveport now has ample scholastic facilities. Besides this public system, there are three private schools and two colleges.

Cotton Produce

Caddo parish, of which Shreveport is the parish-seat, produced more than 48,000 bales of cotton last season. A large number of cars loaded with truck-farm produce were also shipped to points north of this city, and many head of cattle and large quantities of farm produce, such as corn, potatoes and cane, were also shipped from here. Caddo parish is in the rich Red River Valley, which supplies thousands with many of the staple farm products.

Population

Shreveport, with her fine homes, excellent living conditions, manufacturing possibilities and industrious and progressive spirit, is truly a wonderful place in which to live. She has often been called the "Ideal City," both from a moral and commercial standpoint. With a population of 65,000 within her limits and a suburban population of 10,000, she has a splendid basis upon which to build a city of 200,000 or more within the next two decades. Manufacturing industries as well as individuals are aided to locate here by the local Chamber of Commerce, and every possible convenience is afforded to newcomers during the formulation of their organization.

Location

Shreveport is located in the northwestern portion of Louisiana in the parish of Caddo, and is at the head of navigation on Red River. It is situated among the pines of Louisiana's rolling hills and possesses all of the great climatic wealth found in the ozone belt. Its elevation is 251 feet above sea level, which affords a mild, dry climate.

Highways

Shreveport can now boast one of the most modern and complete systems of highways in the South. At the present time there are five main roads, paved with concrete and asphaltic types.

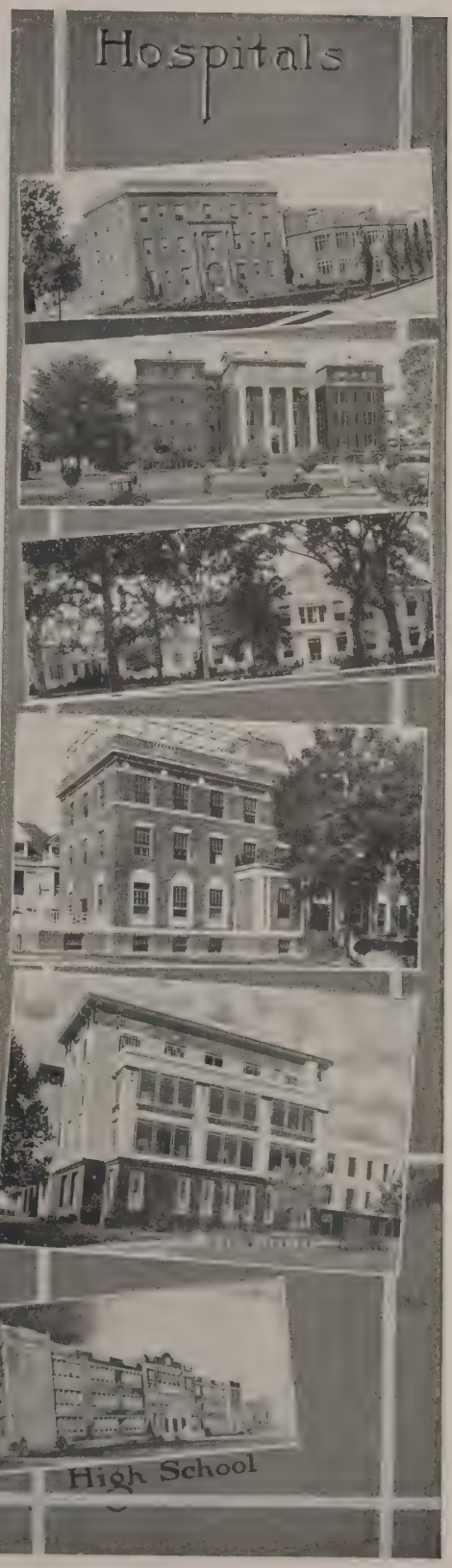
These roads go to the parish line south and southwest to the state line of Texas and Arkansas on the north and west. This system makes Shreveport easily accessible to the entire northwest corner of Louisiana, the northeast portion of Texas and the southwest portion of Arkansas. It affords Shreveport the unique opportunity of being a centralized point for tourists going in any direction.

Probably no other civic work has done more for the upbuilding of the city than has its magnificent road system. Not only are hard-surfaced and paved roads maintained, but a great deal of attention is being constantly paid to the dirt roads of the parish. Bad bends are being straightened, old bridges are being torn down and new concrete and creosote is being placed in their stead. Excellent drainage is afforded these rural highways by complete culvert and drainage systems. The engineers have done a great work in straightening out these obstacles and by having the roads graded heavily, preparing them for future hard-surface roads.

One of the main features of the Caddo parish road system is the absence of the dust nuisance. This has been effectually abated by the use of heavy asphaltic oil. This means a saving of from 30 to 50 per cent to the taxpayers who own automobiles, for dust and loose gravel cause that much depreciation of tires.

The roads were never in better condition than at the present time, and in the near future every road which has heavy transportation will be hard surfaced.

Probably one of the most interesting features of this system is that of all of the millions of dollars spent by Caddo parish for hard-surface roads there is not one cent of indebtedness outstanding against the parish. This is indeed exceptional and probably unrivaled in the South by any parish of Caddo's size and importance as an industrial and commercial center.



By the direct-tax method of real property owners, the "pay as you go" plan has been made a complete success. At three different times for five-year periods this direct tax has been levied, and the present tax, which is for five mills, will run until 1926.

Banking

Few cities in America of equal size have as many strong banks and financial institutions as Shreveport. The city has seven banks, one industrial bank and two building-loan associations. Bank deposits for the year of 1923 amounted to $55,857,165. Total business done in all lines amounted to $1,633,000,000. The average wealth per capita for this city is $767.50, which is considered very high.

As an index to the commercial and financial greatness of Shreveport and the importance of her banking institutions is the fact that she is recognized as one of the great financial centers of the Southwest, by having approximately 16 per cent of all the bank deposits of the entire state of Louisiana in the vaults of this city.

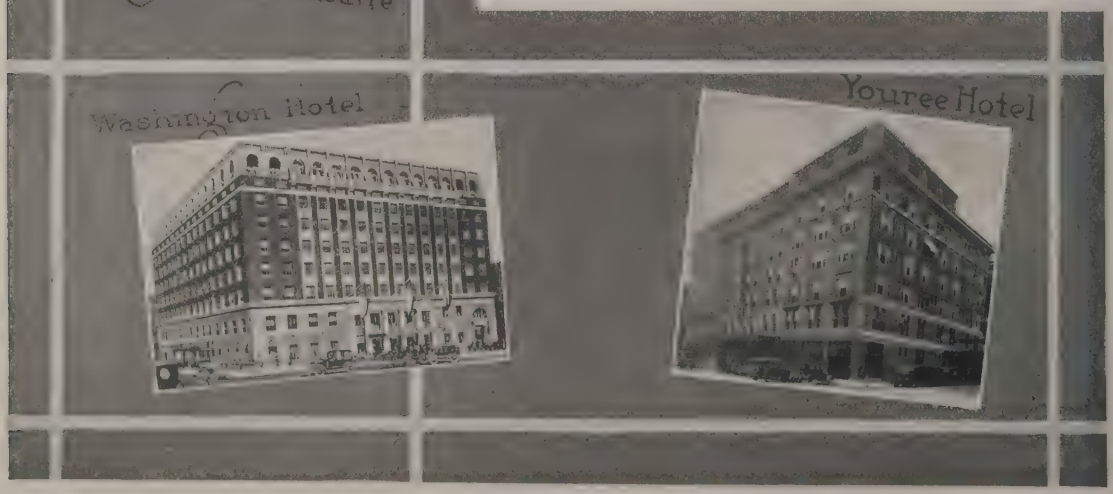
Lumber Center

Shreveport occupies an enviable position as a lumber center. The general character of the country surrounding Shreveport is such that forests of virgin-growth hard and soft woods bound the city on all sides. The variety of forest products produced in and about Shreveport accounts in no small degree for the development of other industries using wood products of the various kinds.

General offices of some of the largest manufacturers in the South are maintained in Shreveport. The annual output of these mills amount to approximately 600,000,000 feet of Southern pine. In addition to this enormous production of lumber by Shreveport interests, 40,000,000 feet of Southern pine and 10,000,000 feet of hardwoods represent the transactions of wholesale and commission merchants, or in all approximately 75,000 cars are handled annually.

Manufacturing Possibilities

To the manufacturing industry Shreveport offers ample railroad facilities, good sites and cheap fuel, supplied by the largest combined oil, gas and lumber district of the United States. Shreveport is served by eight railroads with twelve outlets, and has the advantage of being the largest receiving and shipping point between Kansas City, St. Louis and Memphis on the north and east, Houston and New Orleans on the south,



and Dallas on the west. More than one and one-quarter million dollars per month are paid in freight charges to the railroads operating in and out of the city. Seventy motorbuses are operated on hourly schedules from 40 to 65 miles in almost every direction, making it possible for shoppers to visit Shreveport at all times of the day. The splendid highways radiating out of Shreveport make it possible and profitable to "ship by truck."

The manufacturing possibilities of Shreveport are unlimited and because of this fact new industries are locating here every month. Besides these facilities, this city supplies a trading zone of over 4,000,000 people and is the actual distribution point for over a million. Here the manufacturer can make his products cheaper than elsewhere, under as favorable conditions as exist in the South; ship them as efficiently and at the same time be located in a trading zone which supplies over 4,000,000 people. To the manufacturing industry Shreveport offers great possibilities, not only because of the foregoing facts, but because of its natural location and its close proximity to the richest sections of four large and wealthy states, viz., Texas, Oklahoma, Mississippi and Arkansas.

Minerals and Gas

Shreveport is in the center of the greatest oil and gas producing areas in America. Today but three states exceed Louisiana in the production of petroleum. The value of its mineral-bearing sands is incalculable, since it is generally conceded that capital has but rimmed the edges, so to speak, of oil development. Practically all of the large oil companies in America have offices here.

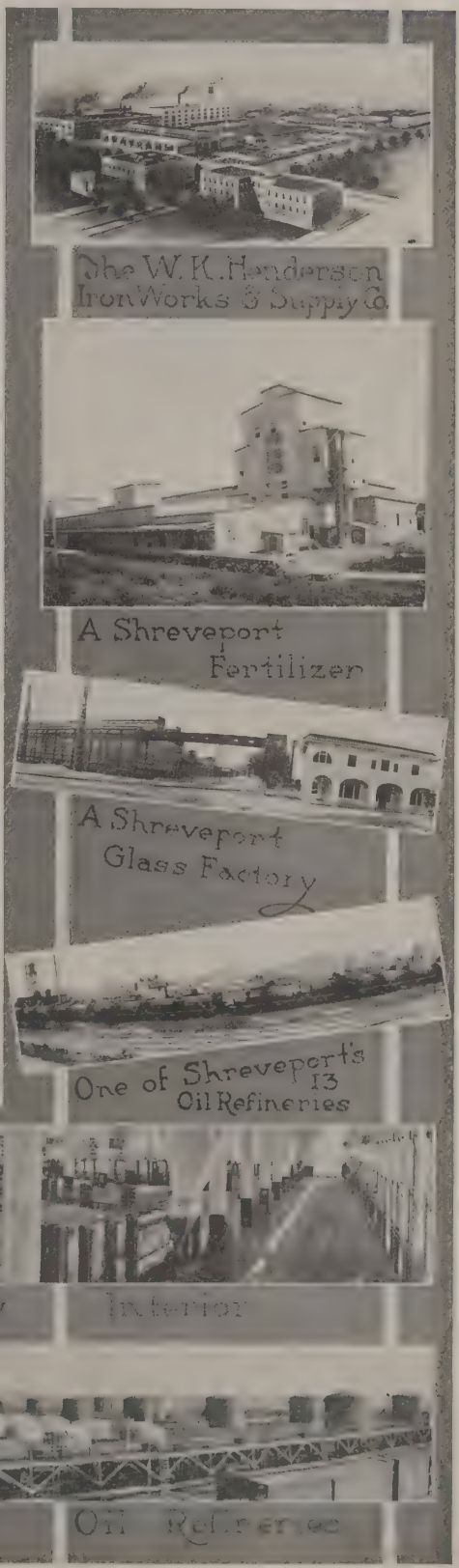
Approximately 35,000 cars of refined petroleum products, including gasoline, kerosene, naphtha, lubricating oil and grease, are shipped annually to all points in the United States east of the Rocky Mountains.

Shreveport has 200 oil and gas companies; 20 oil-well supply houses; 13 large oil refineries; 7 gasoline extraction plants, with total daily capacity of 4,905,500 cubic feet.

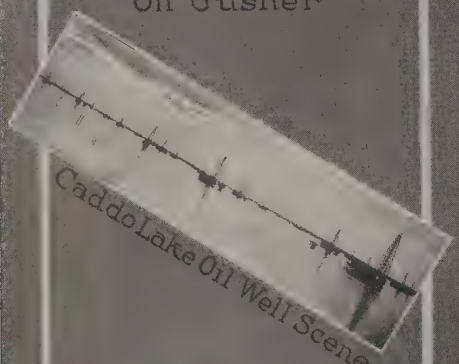
Inflexible commercial laws are working to make Shreveport the industrial and commercial center of the great Red River Valley. Shreveport has 131 manufacturing enterprises, employing over 7000 men, with annual payroll of approximately $10,000,000. Total value of manufactured products is over $34,000,000 annually.

Consumer of Grain Products

Shreveport is a large consumer of grain and grain products and hay. It enjoys the best grain-transit privileges of any


The W. K. Henderson Iron Works & Supply Co.
A Shreveport Fertilizer
A Shreveport Glass Factory
One of Shreveport's 13 Oil Refineries
A Shreveport Glass Factory Interior
One Of Shreveport's 13 Oil Refineries

Oil Gusher



Caddo Lake Oil Well Scene

city in the Southwest, controlling approximately 7000 cars of grain annually. Shreveport is one of the largest inland cotton markets in the South, handling over 200,000 bales annually.

Glass Manufacturing

Shreveport is known as one of the leading glass manufacturing centers of the entire United States. The natural market for this product, together with the favorable facilities for its manufacture and distribution afforded by the city of Shreveport, are responsible for the location of some of the largest glass companies in Shreveport, both manufacturing and distributing.

Caddo Parish

Caddo parish is located in the extreme northwest corner of Louisiana. The parish has an area of 545,280 acres of land, which is characterized as upland and alluvial. In addition to its agricultural wealth, Caddo also has one of the greatest oil and gas fields in the Southland and the greatest gas fields in the world. Gas wells making 50,000,000 cubic feet of the best of all heating and illuminating gas are a matter of everyday occurrence in the Caddo field.

Caddo parish contains the best cotton-producing soil, makes corn equal to any country, produces potatoes and other truck to an extent unexcelled by any other section of the South. The homeseeker will find Caddo parish one of the best places on earth to bring his family and an ambition to build home and future.

Fastest Growing City in the South

Shreveport has been called the fastest growing city in the South and her percentage of increase for 1923 over 1922 is 56 per cent, which truly entitles her to the slogan of "Shreveport —The South's Fastest Growing City." Almost within one year four new skyscrapers made their appearance, together with a proportionate increase in the residential sections, and the city has more than doubled the population she had ten years ago.

With these great financial and geographical advantages and natural resources and strategic location, Shreveport is bound to continue to grow even bigger and better. Good highways, schools, churches, roads, hospitals, unlimited manufacturing possibilities, coupled with an unconquerable spirit of progressiveness, will make a city grow and succeed—then Shreveport will continue to hold her place among the great cities of the United States as the "South's Fastest Growing City" and an ideal place in which to live.

Lumber Mill

Cotton Field Scene

A City Where Happiness and Success Are Found

Possibly no other city in the South has as many natural advantages as Monroe, Louisiana—a fast-growing city of 18,000 people—the largest city in Central North Louisiana—the county seat of Ouachita Parish, and the community and business center of a large and populous territory.

Monroe is located in the heart of the greatest-known natural gas field in the world—a field which covers a proven area of more than 300 square miles and has at present writing more than 250 wells with a rock pressure of 1050 pounds to the square inch.

When one realizes that natural gas is supplied to industries at Monroe at a cost of from five to eight cents per thousand feet—depending, of course, upon the quantity consumed; when one realizes that natural gas is four times as cheap as fuel oil and is the cheapest known fuel, one can easily understand why new manufacturing industries are looking to Monroe as the logical point at which to build their new factories.

Not only is this natural gas available, but there are other things of interest to the manufacturer. Labor is plentiful, both skilled and unskilled, and it costs less than in those sections of the country where living conditions are high. Building materials, such as lumber, clay, sand, brick and tile are all produced locally. Monroe knows no extremes of heat or cold. The winters are neither long nor severe, and out-of-door operations can be carried on at all seasons, and production need never be halted or slowed up.

Monroe is favored by being on the Ouachita River, which is navigable as far north as the city of Camden, Ark., and there is a regular packet service from New Orleans through Monroe to that point. The Public Service Commission of the State of Louisiana has fixed the water rate to New Orleans at 60 per cent of the rail rate, thus opening up an all-water-route transportation to the principal points of the country and through the Port of New Orleans to the ports of the world for all products manufactured in Monroe.

Four railroads serve Monroe—two of which are trunk lines—and splendid motor highways—the Dixie Overland and the Lone Star Route—link Monroe with the rest of the country.

Not only does Monroe present unlimited possibilities on account of its cheap fuel, adequate railroads and water transportation to manufacturers who are desirous of opening up a branch factory in the South, but it is also a wonderful place to live and be happy in. The climate at Monroe is temperate. Roses bloom out-of-doors in December, and snow and ice are seldom seen. The health record of Monroe is indeed good; the death rate being only 11.5 per thousand last year.

With a municipally-owned street railway system, well-paved streets, modern schools and churches of all denominations, Monroe is indeed worth investigation by those desirous of moving into a community where they can prosper and get more of the good things of life.

Many new buildings are going up today in Monroe, among them the new $400,000 court house and the $2,000,000 paper mill by the Brown Pulp & Paper Mill Company, as well as hundreds of new homes, also a $600,000 modern hotel. About January 1, 1925, the Arkansas Light & Power Co. will begin the construction of its mammoth $7,000,000 power plant near this city in our great gas field. All of which testifies to the fact that more and more the business men of the country are looking towards Monroe to furnish them with those advantages so essential to a successful manufacturer and to those people who are desirous of living in a town rich in natural resources and surrounded by a great agricultural country, lending prosperity to the community and success to the individual.

The Monroe Chamber of Commerce will be pleased to furnish any information desired concerning business opportunities in Monroe and vicinity.

THE BUSINESS DISTRICT OF MONROE, LOUISIANA

Mobile, Alabama

An Invitation and a Promise

By R. J. Milling, President Mobile Chamber of Commerce

Mobile presents an inviting aspect. Having acquired a deep-water channel to the Gulf, a canalized waterway to the coal and iron fields and modern port terminals, the Alabama seaport now invites citizens and industries of other sections to move in and assist in enjoyment of the use and benefits of these improvements made by a kindly nation and state.

This invitational attitude is a result of a happy combination of old-time Southern hospitality and good business judgment.

It has required a full century of effort to put Mobile's commercial edifice in order so that this invitation might be issued in perfect good faith and without reservations or limitations. It took 100 years to deepen the 33-mile channel through Mobile Bay from its original 5½ feet to its present depth of 30 feet. Likewise many years elapsed between the beginning of river improvement in Alabama and the final canalization of the Tombigbee and Warrior rivers, with a navigation depth of 8 feet from Mobile to the mineral belt. Then other years passed before inland waterway transportation was systematized and developed, under the direction of the Secretary of War.

Construction of port facilities also followed gradual processes, keeping abreast of Mobile's commerce, until the state of Alabama decided to adopt a policy of seaport building; of making the facilities for handling the business to lead instead of to follow the trend of trade expansion. The groundwork of port building was done by the city of Mobile, with its municipal wharves; the railroads, with their terminal warehouses, coal tipples, grain elevator, timber dumps and lumber wharves; private enterprise, with banana conveyors, cotton compresses and warehouses, and coal handling devices, wharves and storage warehouses, and, finally, the Inland and Coastwise Waterways Service, with its coal and ore handling plant. It remains for the state of Alabama to complete the port to the last needed detail.

Mobile's invitation to industry is extended at the time when this work of port completion by the state of Alabama is under way, and while the plans still can be adjusted or enlarged to gear-in with those of some particular tonnage-producing manufacturing, exporting, importing or distributing enterprise.

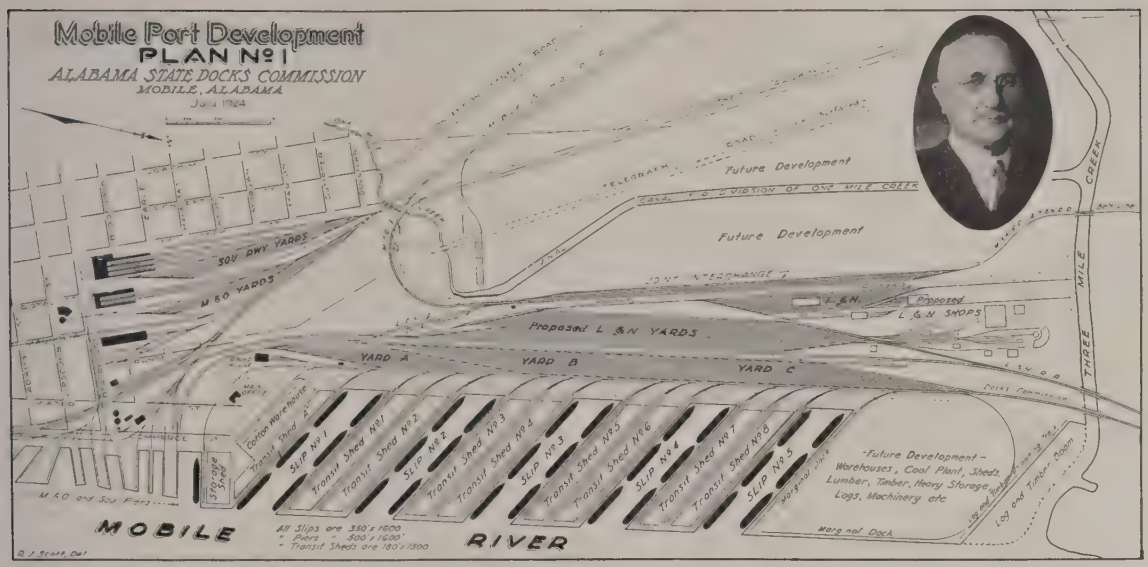
Major General William L. Sibert, U. S. Army, retired, chairman of the Alabama State Docks Commission, in reviewing the plans of the Commission in an address before the American Association of Port Authorities at Los Angeles in October, stated that the Docks Commission purposes to buy all the land needed for the full development of the port by the state, covering a period of many years, and that land not now needed for port improvement can be leased for industrial development.

This offer for the lease of industrial sites at or near the Alabama state terminal system offers a wonderful opportunity for the development of certain lines of trade or manufacture. This is an invitation requiring an immediate response.

The plants so located will have immediate access to every rail line, steamship line and barge line entering the port of Mobile, and will be connected by improved highway with the city. They will have water transportation for their raw materials and finished products. The expense of handling commodities, incoming and outgoing, will be reduced to a minimum by this conjunction of production and transportation. An industry located on the property offered for lease by the State Docks Commission can obtain steel or iron from the Birmingham district at a lower freight rate than the same could be delivered at any other seaport in the United States. The export rate by Inland Waterways Corporation barge line from Birmingham to Mobile on pig iron is 2.20 per gross ton, and the domestic rate is 2.61½. A similar low rate prevails on cast-iron pipe, steel and wire produced in the Birmingham district. The tariff on coal from the Warrior fields delivered at the state docks site is 1.60 per ton.

Plans of General Sibert for the construction of the state's terminal system include a navigation and drainage canal through the property, which will permit barges to deliver their coal at the furnace door of a factory located on the ground which the Docks Commission offers for lease. Cuban or South American manganese or other foreign ores or metals can also be delivered there at the lowest possible cost.

Panoramic view of the Port of Mobile, from the plant of the Alabama Dry Dock & Shipbuilding Co. on Pinto Island (left) to the mouth of



The State Docks Commission of Alabama, of which Gen. William L. Sibert (inset) is Chairman and Chief Engineer, is constructing at Mobile a complete port terminal system immediately north of the present improved frontage on Mobile River. The Louisville & Nashville Railroad is to be moved back to make room for piers, slips, transit sheds and railroad yards.

Bauxite is shipped through Mobile by rail to St. Louis for the manufacture of aluminum, then aluminum ware is shipped back to the Gulf ports for export and domestic distribution. Cheap electrical power for large industries now is offered by the Mobile Electric Company, from a generating plant that receives coal by barge and rail from the Warrior coal fields. Mobile is 280 miles as the high-voltage transmission line runs from the immense hydro-electrical developments at Muscle Shoals, and is only 175 miles from the important hydro-electric plants of the Alabama Power Company on the Coosa and Tallapoosa rivers, some of which are now in operation and others under construction. Mobile is included in the tentative plans for the distribution of power from both of these sources, and it is stated with some color of authority that transmission lines to Mobile will be completed in the near future. This combination—bauxite imported at a small cost for freight and handling, cheap and abundant electrical power, cheap fuel, ocean, barge line and rail distribution for the finished product—cannot be duplicated at any other port in the United States, if, indeed, it exists elsewhere in the world.

These same conditions will make the land offered by the Docks Commission an excellent location for a sugar refinery. Steamers from the Indies will find in raw sugar a needed item of return cargo, and distribution of refined sugar from Mobile can be effected with economy via rail and water carriers.

Manufacture of steel at Mobile is a tried and proven industry. One plant has been in operation for ten years, making electric steel castings, chiefly gears and pulleys, which are shipped to many points within the mineral and manufacturing district of Alabama. Another Mobile plant fabricates structural steel from Birmingham on a large scale and has found the business profitable.

Proximity to the Birmingham district, and cheap transportation costs on coal and iron products, no less than the growing maritime importance of the port, induced the Todd Shipyards Corporation to install a plant at Mobile for the repair and construction of steamers and other ocean craft. The Alabama Dry Dock & Shipbuilding Co. is assembling steel barges for the Tennessee Coal, Iron & Railroad Co., a subsidiary of the United States Steel Corporation, the steel being barged down the river from the

ile Creek (extreme right), where the Alabama Docks Commission is building a state-owned terminal system to cost $10,000,000

company's mills at Birmingham. While the demand for new ocean tonnage was active in this country, many first-class steamers were built at Mobile because of these conditions governing transportation and production.

When all these facts are taken into consideration it will be observed that Mobile's invitation to industry is not one of an experimental character. Industrial pioneers at the Alabama seaport have blazed the trail for the builders that are to come.

Mobile is seeking to arouse the interest of producers of iron and steel. Mobile desires to be considered by manufacturers in the light of the "Pittsburgh-Plus" decision of the Federal Trade Commission. The Commission has expressed the opinion that their order would eventually force the consumption of iron and steel products in districts in which they are produced. If new plants are to be built at the seaboard, Mobile most certainly is entitled to such consideration. No port in the United States offers the same access to important coal and iron-producing centers, to the Panama Canal and to the Pacific ports reached via the canal.

General Sibert, one of the builders of the Panama Canal and a recognized authority on the subject, said in a recent address:

"The completion of the Panama Canal opened up new routes for trade of almost unlimited possibilities, and Gulf ports that met the new activities with attractive harbor facilities have grown rapidly.

"The Pacific Coast has only commenced to feel the effect of the Panama Canal. Prior to its opening the transcontinental freight rates were necessarily so high that the products of ordinary industries could not pay freight charges and compete in the markets of the eastern part of the United States. The cheap freight costs between the coasts now made possible by the Panama Canal will surely cause industries yet unthought of to spring into existence and thus continually augment the tide of commerce across the Isthmus of Panama.

"In spite of the adverse trade conditions immediately following the World War, coastwise commerce is now more than a million tons a month. All of this indicates that a port providing suitable facilities now still has an opportunity to share in this increasing trade."

The Luckenbach Line (Mobile Liners, Inc., agents) now has six vessels in the service between Mobile and the Pacific Coast, ranging in size from the Edgar F. Luckenbach, 12,614 tons, to the Florence Luckenbach, 8,340 tons. These vessels arrive and depart every two weeks, carrying westward Alabama coal, iron, steel, marble, forest products, naval stores, ornamental evergreens, raw and manufactured cotton and other Southern and Mississippi Valley products, returning from the Pacific Coast laden with canned goods, red cedar shingles, Oregon fir stringers and bridge timbers, beans, peas and other products of the Western seaboard. There has been a steady increase in the commerce carried by this and other lines in the intercoastal trade from Mobile. Pacific Coast salesmen are constantly developing new markets in Southeastern territory. Borax, alfalfa hay, flour and a growing list of commodities is moving by this route as a result of their efforts.

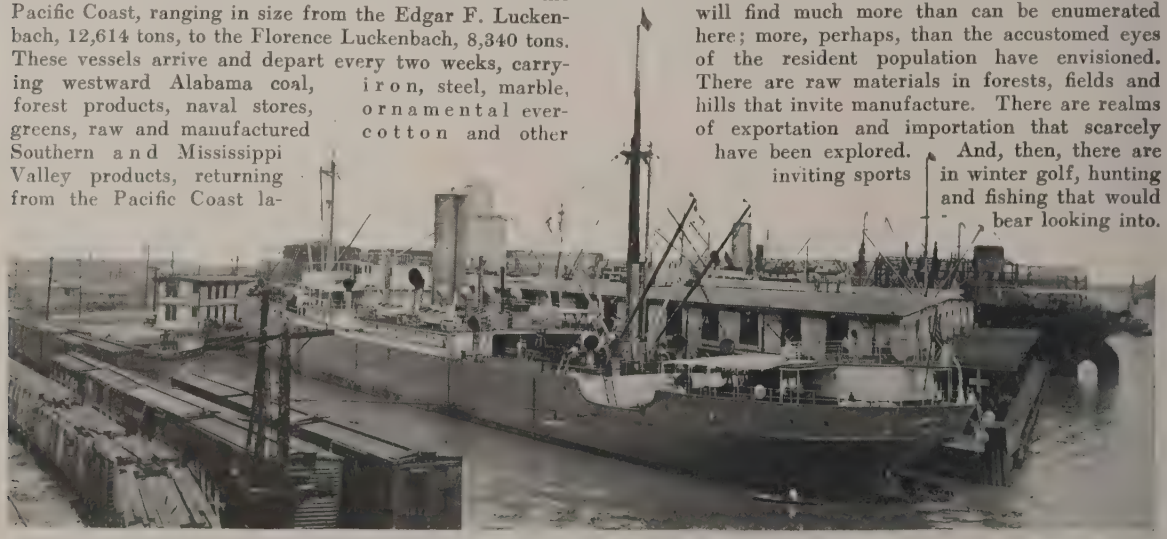
Mobile Oceanic Line (Waterman Steamship Corporation, agents) is the trade name for the United States Shipping Board service from Mobile, Pensacola and Gulfport to all United Kingdom, French Atlantic, Belgium, Holland and German ports, with two sailings per month to Liverpool, London and Rotterdam, one sailing per month to Manchester, Havre, Antwerp and Bremen, and a service based on cargo offering for such ports as Newcastle-on-Tyne, Cardiff, Newport, Hull, Aberdeen and Leith.

The export cargo handled at Mobile by the Shipping Board vessels consists largely of pine timber and lumber, hardwood lumber and logs, flour, cotton and cottonseed products, cooperage stock and naval stores. A regular westbound service is being maintained from Hamburg and Bremen to the ports of Mobile, Pensacola and Gulfport. The bulk of this return cargo consists of kainit and other fertilizer materials and general cargo, such as roofing slates and other manufactured articles.

The Transmarine Corporation and the Mallory Steamship Line make regular sailings to New York, the United Fruit Company and Aluminum Line to Central American ports, the Munson Line to Cuba, the Aluminum Line to the West Indies, Leeward Islands and the North Coast of South America, and the Munson Line to Brazil and River Plate ports. In addition to these steamship lines making regular sailings, there are others that sail to and from Mobile, carrying commerce of every important port in the world.

Mobile's banks are well equipped to handle the financial end of the port's commerce, and the Foreign Trade Department of the Mobile Chamber of Commerce is in position to help shippers in many ways.

Those who accept the invitation extended by the port and people of Mobile and investigate the things that are offered in the way of commercial opportunities will find much more than can be enumerated here; more, perhaps, than the accustomed eyes of the resident population have envisioned. There are raw materials in forests, fields and hills that invite manufacture. There are realms of exportation and importation that scarcely have been explored. And, then, there are inviting sports in winter golf, hunting and fishing that would bear looking into.



Mobile & Ohio Railroad and Southern Railway terminals at Mobile, near the site of Alabama's state terminal development. The steamer Bessemer City in the slip was built at Chickasaw, Mobile suburb

Descriptive Advertisement

Little Rock, Arkansas—An Industrial View

The Arkansas Metropolis a Proven Success as Production Center.

By Warren T. King

From the industrial point of view, the advantages of Little Rock are these: a central location in the heart of the continent, midway between the Lakes and the Gulf, between the Atlantic and the Pacific, in the center of the richest and most rapidly growing section of the great Mississippi Valley, with its ever-increasing demand for factory products; a remarkably varied and plentiful supply of raw materials within short haul; excellent railroad service, with rates permitting fair competition with other industrial centers; plenty of industrial fuel, natural gas, oil, coal, wood and electric power at low costs; a large supply of both white and black native-born American labor, open-shop, English-speaking, intelligent and law-abiding; a climate which reduces heating expense to a minimum and permits open-air labor the year around; a prosperous and firmly established city of 115,000 people, with a strong, varied industrial life and every modern convenience, fine stores, schools, churches, homes and an abundance of wholesome recreation for the industrial worker and executive.

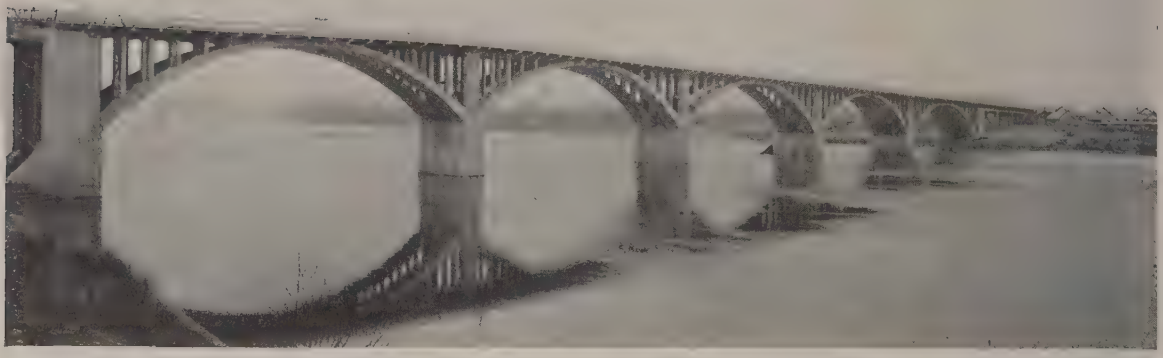
From the standpoint of sheer variety, the raw industrial materials immediately adjacent to the Arkansas metropolis are astonishing. From bauxite to strawberries, from coal to cotton, from crude oil to pearl-shell to whetstones, the calendar of resources runs like a kaleidoscope, embracing hundreds of animal, vegetable and mineral products of mine, river, forest, field and farm.

Arkansas is truly the "Wonder State" in the great variance of its topography and geology and in the variety and value of its resources. For this great state, Little Rock is the focal point—the center of finance, industry and commerce. Already a proven success as an industrial city, the promise of tomorrow is bright.

Minerals produced near Little Rock in large industrial quantities include petroleum, coal, natural gas, bauxite, brick, bond and pottery clays, diamonds, kaolin, tripoli, manganese, lignite, zinc, marble, granite, sandstone, oilstone, lead, lime, sand, shale, gravel and an abundance of excellent and varied mineral waters.

Arkansas is one of the few states which still have large areas of commercial forest awaiting utilization. Seventy per cent of her land area is still woodland and forest. The present stand of commercial timber in Arkansas is variously estimated at from thirty to fifty billion feet. The present consumption of commercial timber is about one and one-half billion board measure feet, of which almost a billion feet is short-leaf yellow pine. Other native woods manufactured annually in quantities varying from one hundred million to two million B. M. feet are, in the order of their use, red gum, long-leaf pine, white

AEROPLANE VIEW OF RETAIL BUSINESS DISTRICT, LITTLE ROCK, ARK.—Photo by Hogue of Little Rock



ARMY MEMORIAL BRIDGE CONNECTING LITTLE ROCK AND NORTH LITTLE ROCK

oak, hickory, red oak, ash, cottonwood, cypress, elm, tupelo and sycamore. Other native woods used commercially in quantities less than a million feet each per year include persimmon, white pine, hackberry, osage orange, maple, birch, yellow poplar, walnut, locust, mahogany, basswood, beech, cedar, cherry and sugar pine.

Field crops to the value of over $200,000,000 each year include cotton, cottonseed, corn, rice, peas, peanuts, potatoes, sweet potatoes, hay and rice-straw.

Fruit and truck crops to an average annual value of $19,764,000 include apples, peaches, strawberries, grapes, cantaloupes, tomatoes, pears, watermelons, blackberries, onions, cucumbers, beans, pecans, black walnuts and hickory nuts.

Live stock and animal products include horses, mules, cattle, calves, sheep, swine, goats, poultry, eggs, milk, cream, butter, honey, wax, wool, mohair, pearls, pearl-shell and wild furs, for which the average annual gross sales total $40,000,000.

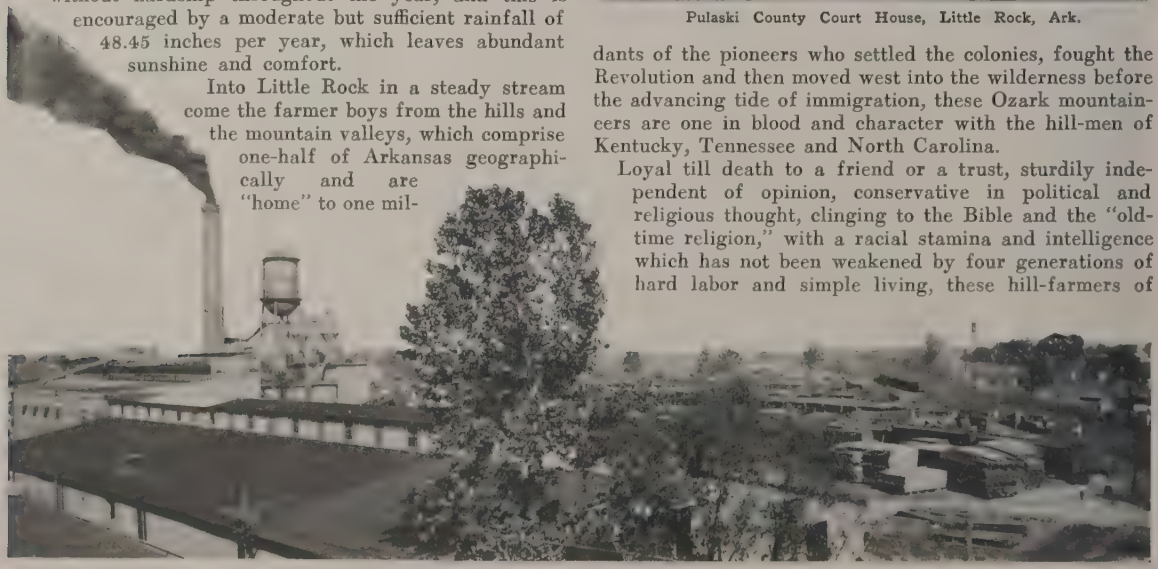
Combining with these vast resources of raw materials in a way conducive to industrial prosperity is a mild and genial climate, with only occasional short periods of freezing weather in midwinter. Outdoor labor is performed without hardship throughout the year, and this is encouraged by a moderate but sufficient rainfall of 48.45 inches per year, which leaves abundant sunshine and comfort.

Into Little Rock in a steady stream come the farmer boys from the hills and the mountain valleys, which comprise one-half of Arkansas geographically and are "home" to one million sturdy souls. These Arkansas hill-farmers from the Ozarks led the nation in physical fitness at the drafts in 1917-18; a smaller percentage of them were rejected from military service than of any other state in the nation; Arkansas leads in physical fitness.

Of the purest Anglo-Saxon and Celtic strains, descendants of the pioneers who settled the colonies, fought the Revolution and then moved west into the wilderness before the advancing tide of immigration, these Ozark mountaineers are one in blood and character with the hill-men of Kentucky, Tennessee and North Carolina.

Pulaski County Court House, Little Rock, Ark.

Loyal till death to a friend or a trust, sturdily independent of opinion, conservative in political and religious thought, clinging to the Bible and the "old-time religion," with a racial stamina and intelligence which has not been weakened by four generations of hard labor and simple living, these hill-farmers of



PARTIAL VIEW OF BIG HARDWOOD FLOORING PLANT OF E. L. BRUCE CO., LITTLE ROCK

TYPICAL OF THE FINER BANK, OFFICE AND STORE BUILDINGS OF LITTLE ROCK

"OLD STATE HOUSE," TERRITORIAL CAPITOL 1833-1836—NOW ARKANSAS WAR MEMORIAL BUILDING. FINE EXAMPLE OF ANTE-BELLUM SOUTHERN ARCHITECTURE

Arkansas form one of the greatest industrial assets in the United States.

They form a great reservoir of high-class labor; self-respecting, God-fearing people, capable of being trained to any required degree of skill and productive of efficient foremen, superintendents and executives. The radical intrigues of bolshevik agitators receive short shrift at the hands of the Ozark mountaineer. Definitely committed to the American "open-shop" policy of free labor as the birthright of man, Little Rock is free from strikes, class hatred and labor troubles. Skilled labor is 85 per cent white, and only 5 per cent of this skilled white labor is foreign-born.

The question of industrial fuel is one to which Little Rock has many fortunate answers. There are two natural-gas fields in Arkansas, supplying an abundance of dry, clean, odorless gas with a heating test of 1057 British thermal units. This makes possible very cheap steam power and consequently steam-electric power, at a price as low as the cost of hydro-electric power in the famous Piedmont region of the eastern South.

For oil burners, the great fields of south Arkansas are producing and refining millions of gallons of fuel oil within short haul of Little Rock. To the northwest, 75 miles from the city, lie the vast semi-anthracite and bituminous Arkansas coal fields, with a workable area of 1584 square miles and an estimated original supply of two billion tons. Two million tons of high-grade coal is now being mined every year in seven Arkansas counties. An unlimited quantity of excellent cordwood, mostly scrub oak, can be had at $3 a cord f. o. b. any one of a thousand railroad spurs in this densely wooded state. There is always another answer ready when the question of industrial fuel comes up in Arkansas.

With more miles of navigable rivers than any other state in the Union, flowing down through the narrow valleys of the Ozark Mountains, Arkansas has wonderful opportunities for water-power development. Six great hydro-electric power dams are today in course of construction. Within a few years Arkansas will be net-worked with high-voltage transmission lines, carrying the energy of her rivers, converted into electricity, into every industrial center in the state.

Coal, oil, natural gas and wood can eventually be exhausted by use, no matter how rich the supply; but the energy of the rivers of Arkansas is eternal when measured by the life of the human race. Within a few years water-power will supply electric current for the industries of Arkansas during eight months in each year, and the mineral fuels will be a reserve, used to carry on the production of electric power during possible periods of low water.

Railroad facilities and service at Little Rock are excellent and freight rates are conducive to industrial development and expansion. There are eight distinct rights of

ONE OF SIX GREAT COTTONSEED OIL MILLS AT LITTLE ROCK, WHICH SHIP 4,000,000 GALLONS OF EDIBLE OIL ANNUALLY

way leading into the city, with connections to every point of the compass. The three systems serving the city—the Missouri Pacific, the Rock Island and the Cotton Belt—provide excellent service and connections to every part of the country. In the year ending November 1, 1923, total carload traffic for Little Rock was 94,965 cars of merchandise, of which 52,770 were inbound and 42,195 were outbound. The industrial belt circles the city, following the main lines of the Missouri Pacific and Rock Island systems. Little Rock has 125 miles of yard and industrial tracks in the city and the industrial suburbs; in the past five years the railroads have spent over $2,000,000 in improving these facilities, which are now adequate to all demands.

The City Hall of Little Rock

The management of each of these railway systems is fully convinced that the business they now receive from Arkansas, valuable as it is, is very small compared to what the near future holds when the state becomes industrial on a scale comparable to her resources and opportunities.

More than three thousand factories are now operating in Arkansas, and the industrial life of the state has just begun. More than two hundred of these factories are located at Little Rock, and Little Rock capital supports many more throughout the state.

According to statistics compiled by the United States Census of 1920, in 1919 the total value of Arkansas' manufactured products equaled the return from all field crops for the year and approximated the average annual value of all minerals mined. The state stood on an evenly balanced tripod of income, whose three legs were manufacturing, mining and agriculture. A dependable and permanent prosperity is being built on this basis.

All three legs of this economic tripod, upon which rests the prosperity of Arkansas, are growing stronger yearly. It is a question whether, with passing years, mining and agriculture, those two sources of raw materials which now absorb the labors of a large majority of Arkansas' population, will be able to equal the percentage of increase shown by manufacturing. Every year more and more of the people and the capital of Arkansas turn from the mere production of raw materials to the production, from her raw materials, of varied commodities ready for human use and consumption.

The chief need of today, from the industrial point of view of both Little Rock and Arkansas, is the importation of able men of industrial training and experience. This is not a statement that Arkansas is barren of industrial thought and initiative. That is very far from the truth. What is meant is that Arkansas' present industrial development, although it is wide, varied and prosperous, is only a beginning, a scratching of the surface of vast opportunities.

Little Rock's Modern Fire Department Building

The swing of an intensely agricultural people, living in a fertile country with a relatively thin population, from the culture of the soil to industrial development, is necessarily a long, slow movement. The habit of industrial thought has not been developed; the native eye, no matter how able, is first concerned with crop production. This fact alone is responsible for Arkansas' failure to lead in the industrial roster of states.

In no other state are all the necessary elements more plentiful or better co-ordinated for a general, widely varied and profitable industrial expansion. All that is lacking is that industrial experience which promotes industrial thinking. Arkansas is calling to able men of industry.

Only a few general truths

INDUSTRIAL GROUP IN NORTH LITTLE ROCK, INCLUDING FERTILIZER, TILE, ACID, CHEMICALS AND COTTONSEED OIL PLANTS

WEST SIDE JUNIOR HIGH SCHOOL, LITTLE ROCK, ARK.

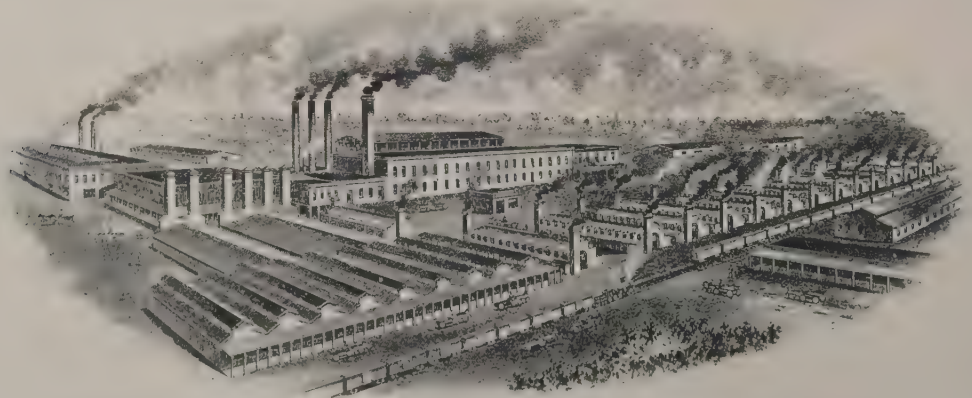
concerning Arkansas and Little Rock, from the industrial point of view, can be dealt with in this article. An intelligent handling of details is out of the question. The space will not suffice to picture the more than thirty-one hundred factories of the state, employing fifty-eight thousand workers, and so varied in their scope that a tabulation of their principal products resulted in 115 major classifications. We can only mention one or two examples.

In point of payroll and number of craftsmen, the greatest single industry in Arkansas today is probably the Missouri Pacific Railway shops in North Little Rock, although this claim may be quickly questioned by the great yellow pine mills at Huttig, Crossett, Malvern, Warren and other south Arkansas points. Three thousand machinists, boilermakers, blacksmiths, car builders, carpenters and painters are daily at work in the North Little Rock shops, earning an annual payroll of $4,500,000.

In South Little Rock are the Biddle shops for the Arkansas division of the Rock Island system of railways, employing 600 machinists, car builders and yardmen, with a payroll of $800,000 a year. Excepting the railway shops, first place in Greater Little Rock goes to the six cottonseed oil mills, which ship 4,000,000 gallons of oil each season, with by-products of 2500 cars of meal and 600 cars of hulls.

Some plain facts about Little Rock for 1923 may thus be summarized: Bank clearings, $605,007,351.41; bank resources, $46,200,522.72. Fourteen national and state banks. Fifteen mortgage and investment companies. Thirteen building and loan associations. Population: Little Rock, 96,500; North Little Rock, 18,500; total 115,000; white, 75 per cent; negro 25 per cent; foreign-born, 8 per cent. Public school enrollment: Little Rock, 14,064; North Little Rock, 3652; total, 17,716. Building permits 1923: number, 2538; value, Little Rock, $3,665,627; North Little Rock-Fort Roots, $1,210,204; total, $4,875,831. City area: Little Rock, 17½ square miles; North Little Rock, 7½ square miles; total Greater Little Rock, 25 square miles. Assessed valuation (50 per cent) all property, $75,000,000. Churches, 134. Hospitals, 12; capacity 900. Parks, 6; total acreage, 455. Hotels, 12; capacity 4000. Industrial plants, 290; gross annual value manufactured products, $175,263,894.26. Total daily circulation of three local newspapers, 81,000. Theaters, 12; capacity 9500. Postoffice receipts, $794,032.24. Number of telephones in use, 18,000. Number of miles of street-car tracks, 47. Number of miles paved streets, 142. Number of daily passenger trains, 74.

All inquiries regarding Little Rock, North Little Rock or Arkansas will be promptly and carefully answered by the Little Rock Chamber of Commerce.



THE ARKANSAS BRICK AND TILE COMPANY'S PLANT, WHICH HAS MADE LITTLE ROCK ONE OF THE LEADING FACE-BRICK CENTERS OF THE COUNTRY

An Upbuilder of Asheville

Unlimited patience exercised in discovering unutilized things of value, overlooked by others in the mad rush of the masses, and converting natural waste products into profitable channels has been the pleasant and profitable pastime of a modest, quiet, unassuming genius with a supercreative mind and an abiding faith in the future.

Recently the people of Asheville, N. C., gave a demonstration of reverence and love for its esteemed citizen and empire builder, E. W. Grove, whose faith in the city's destined progress during the past twenty years has resulted in probably the greatest constructive building program ever undertaken by any single individual in the South. Three hundred representative citizens assembled in the spacious lounge of the new Battery Park Hotel, which Mr. Grove completed last month, after literally moving a mountain from the business center of Asheville to provide a suitable site for this his latest completed project. The Merchants' Association presented him with a beautiful gold-headed cane as a token of confidence, honor and respect for Asheville's greatest builder. Citizens from all walks of life joined in honoring the great developer and leader, who knows most of them by their first names, and is never in too big a hurry to advise with them.

Coming as a tourist to the mountain town of Asheville in 1900, Mr. Grove was greatly benefited in health and impressed with the unusual summer and fall climate as well as the potential possibilities in developing the nearby natural resources, abundant but sadly neglected.

Grove Park Inn

One day while "hiking" the foot-trail up Sunset Mountain, which is in the suburbs of Asheville, he discovered what later proved to be an immense deposit of remarkable building stone. A careful survey revealed the possibility of cutting away the side of the mountain and to simultaneously create a hotel site, and make available the greater portion of the material required to erect the building. The great boulders from Sunset Mountain, in weird fantastic shapes, and studded with mica and other brilliants, gave great latitude to the creative imaginations of Mr. Grove and his son-in-law, Mr. Fred L. Seely. The composite result was Grove Park Inn, reputed the finest resort hotel in the world. It was built by hand, in the good old-fashioned way, spacious, comfortable and wholesome.

Sunset Mountain

Above this giant hotel structure stands the majestic Sunset Mountain. A splendid circular scenic highway was built to its summit. From this point of vantage there is an excellent view of the city of Asheville, the French Broad and Swannanoa rivers, threading the fertile valleys below like shining bands of silver in a setting of velvety green and surrounded by the highest mountain peaks east of the Mississippi River.

Grove Park Development

In 1905 Mr. Grove acquired a considerable area of undeveloped property surrounding the Asheville Country Club and golf links, and began creating the famous Grove Park, one of the largest and finest residential developments in any resort city. Hundreds of beautiful mountain-villa sites, with spacious summer homes owned by wealthy people from all parts of the world, complete the visioned panorama of progress originally conceived in the mind of this master builder. Lots in Grove Park originally sold by Mr. Grove at $1500 now readily command $20,000 each. In fact, so skillfully have all the operations under his direction been conceived and executed that any and all properties sold by Mr. Grove have proven highly profitable to purchasers. One salient feature of his developments is that no property is offered until every modern convenience is provided in advance, thus eliminating the possibility of future disappointment or failure to realize expectations.

The Manor

Another unique property owned by Mr. Grove is The Manor, a hotel-series of complete magnificent homes, adjacent but separate and distinct from each other, yet provided with home comforts plus co-operative hotel service. The Manor is a composite aggregation of palatial homes in a spacious and well-wooded private enclosure where the service is equal to that which guests might expect to receive at any other large hotel in America and is kept up to this standard. As is the case in all of Mr. Grove's various enterprises, he selects the highest type of men possible to manage this property. The amount of compensation is a minor matter, for he is a thorough believer in surrounding himself with the most competent men to be obtained.

Inspired by Water-Polished Boulders

One day while walking along the banks of the beautiful Swannanoa River, which winds its silvery way through the fertile valley of the same name, Mr. Grove noticed a large number of round, smooth pebbles and boulders of various sizes in the bed of the river. Examination revealed their graceful rotundity and high polish, due to constant running water for thousands of years. It occurred to him that they might, by proper machinery, be sorted into uniform sizes and the product profitably commercialized. He secured samples of these stones and had an exhaustive survey made to determine the possibility of their being put to some useful purpose. The report was so favorable that he had his engineers determine the available quantity of this newly discovered building material, and his technical experts began immediately to develop plans for utilization.

Grove Gravel Refinery

The result is seen in the great washing and sorting plant recently put in operation fourteen miles east of Asheville on the Swannanoa River. This plant is capable of assembling, sorting, washing and loading into cars a hundred tons of rock and gravel per hour. Thus the Grove Sand & Gravel Co. of Asheville came into being, and the Southern Railway has built a spur-track for this enterprise which will hold the 25 cars required to handle the daily output.

Grovemont-on-Swannanoa

A large amount of this symmetrical polished stone and gravel will be used in erecting buildings and making streets in the new, model townsite of Grovemont-on-Swannanoa.

Last summer when Mr. Grove announced the founding of this new town twelve miles east of Asheville on the paved State Highway, half a mile from the present Southern Railway station of Swannanoa, the site selected was unanimously approved as being ideal by all who viewed it. The location is on a plateau overlooking the Swannanoa Valley, while back of it is a virgin mountain forest from the reservoir on which comes the water supply for

ENTRANCE TO GROVE PARK INN, ASHEVILLE, N. C.

Grovemont. Engineers were set to work laying out the townsite, with ample space for lakes, parks and gardens. City planners were engaged to lay out the streets, marking spaces for homes, churches, postoffice, library and town hall.

Solves Auto-Parking Problem

The parking problem was given such attention that it is expected that in Grovemont there will be ample space for motor vehicles, without congestion, for the next fifty years. The undertaking represents to this territory the first municipality planned according to scientific principles to the last detail and built for the future instead of for the needs of the moment. Good roads, extending throughout western North Carolina, and automobiles are changing conditions, which in the past have forced people to cramp themselves into city areas that have become so crowded that for many there is literally no room to breathe, much less space for safe and convenient movement of pedestrians and vehicles. Mr. Grove is of the opinion that anything, whether it be hotels, dwellings, or even towns and cities, should be built by well-ordered plans and not allowed, like Topsy, "just to grow up."

Scientifically Planned Townsite

The announcement of this bold experiment in scientific town planning and building in anticipation of fifty years' growth created genuine interest.

Town planners from abroad, city managers from various parts of the United States, editors of metropolitan papers, national and state politicians wrote for details or personally journeyed to Grovemont for first-hand information. Those who had seen Mr. Grove tear away a portion of Sunset Mountain in the suburbs of Asheville and there erect Grove Park Inn, and create the Grove Park Development, with dozens of expensive villas, and lastly demolishing a small mountain in the heart of the business district of Asheville and erecting on this site the new Battery Park Hotel, and incidentally creating valuable business lots on newly made Coxe avenue by utilizing the earth thereby removed, confidently believe that he will succeed in a far-reaching way with the new townsite of Grovemont.

Mr. Grove's observations have shown him that the average American city is a creature of chance and uncontrolled growth. As a rule, "it just happened." Very rarely can it be said of any municipality that some far-sighted, courageous person planned it and brought it into being with regard to any future vision or requirements. The consequence is that the American city is a queer mixture of beauty and ugliness, of efficiency and inefficiency. In most cities new arrivals receive a poor, first-hand impression of a city's greatness or beauty by reason of the general custom for railroads to enter at the back door. In other cities squalid slums may be found nudging elbows with beautiful residential districts. Narrow streets lay upon the city the curse of dangerous traffic congestion. The width of the city streets have not been gauged with any vision or foresight for future developments. The coming of the automobile industry has illustrated this vividly in all American cities. The present generation is forced to pay heavily for the neglect of the preceding one. Another foresighted provision in the new town of Grovemont is the acquisition of a mountain watershed, covering 500 acres of virgin forest, which will supply the reservoir being built for storage of the water supply for greater Grovemont-on-Swannanoa. The entire mountain has been fenced in, thus protecting the water from all possible con-

tamination. Around the town will be located lakes and parks in a wealth of natural flora, forming a veritable Garden of Eden.

When it was announced that 300 lots in Grovemont would be complete and opened to the public this season, more than 600 people almost immediately registered their names for allotment of lots—thus overselling the entire proposition by 100 per cent before the engineers completed surveying even the business section. The lots were all sold at the same price, preference of choice being given registrants in accordance with numeric order in which they had filed their applications. The streets were laid out, sewers, water and electricity provided before anyone was permitted to select a lot. Already construction has been started on a dozen residences and improvements will be continued during the winter. Additional lots are now being surveyed to supply new settlers expected next spring in the Swannanoa Valley, where there are also other big developments, such as the Beacon Mills' million-dollar project, just across the river from Grovemont. The natives are reaping a harvest of gold by the increase in land values. One country preacher sold his land to the **Beacon Mills for $70,000.**

Born in Tennessee

Paris, Tenn., where Mr. Grove was born in 1850, contains many citizens who are proud to relate incidents of his youthful days, which were spent as a clerk in the drug store of Dr. Caldwell. In those days the blighting influence of the reign of the carpet-baggers, following the war between the states, was felt severely in this section of the South. His salary was a mere pittance, but he was accustomed to hardship, and, born with an unusual amount of patience, stuck to his job until he was twenty-two years old, when his employer, who was a practicing physician, retired from business, selling out his store.

Young Grove, having, then amassed a capital of $800, decided to go into business for himself. He went to Louisville, Ky., for a conference with a wholesale drug house who knew him as having operated the drug store for Dr. Caldwell, and they extended him a line of credit, and he started in a small way a business of his own in Paris. Here he remained for ten years, building up a large drug business by patience and expert work.

A Man of Patience

A typical illustration of the patience of young Grove was displayed when a circus came to Paris. It attracted a tremendous crowd of country people to town. All of his clerks were extremely busy, particularly at the soda fountain, when Mr. Grove observed a country youth gazing steadily at a show case and looking as if he was ashamed to ask for what he wanted, but evidently wanted that something very much. Going over to the youth, he asked: "My friend is there something you would like?" "Yes," replied the youth; "I want a jew's-harp." Looking over the display of harps, he slowly selected one, and after playing a tune thereon, remarked to Mr. Grove, who had remained patiently standing by, even though his store was crowded with customers anxious to be waited upon, that it was pretty good. He then tried another harp, five minutes playing "Annie Laurie," "Down on the Suwanee River" and other selections, finally winding up with "Home Sweet Home"; then he handed the harp back to Mr. Grove and said, "Much oblige; I left my harp at home today and felt just like I wanted to play a little bit."

Finds Waste Product in Drugs

During the first ten years' operation of this store Mr. Grove, in experimenting with drugs and chemicals, found that there was a great deal of waste product. Finally, he succeeded in isolating a certain alkaloid by-product in the manufacture of quinine, which up to that time had been thrown away by quinine manufacturers, which he combined with other ingredients and produced the famous Grove's Tasteless Chill Tonic, which is now known the length and breadth of the land. The invention of this remedy caused Mr. Grove and friends to organize the Paris Medicine Company. The demand increased so rapidly that it was necessary to have better transportation facilities, so the company moved to St. Louis. A period of general business depression had set in and it seemed for some time as though all of his money and that of his friends back in Paris, who were helping him to finance his company, would be lost. The patience of Mr. Grove again stood the test, and very shortly success came, and other remedies, including Bromo - Laxative-Quinine, were added to the output of the factory.

Visits Asheville

The profits of the business had amounted to a considerable sum when Mr. Grove came as a tourist to Asheville in 1900. Here, as in other places, waste products attracted his attenion. He bought several small tracts of land, and by 1905 had become a regular sum-

NEW BATTERY PARK HOTEL, ASHEVILLE, N. C.

mer resident of Asheville. The first property sold in Asheville was in 1908, for which he received $1500. Today this same lot is valued at $20,000. Since that time Mr. Grove has been a leading factor in the development of Asheville. His success has been extraordinary. One remarkable fact is that any and all properties he has sold are now worth many times the price at which they were disposed of. He knows and believes in western North Carolina property. Furthermore, every business concern or enterprise he has established is now on a sound financial basis. Like his hotels, all of them have paid for themselves many times over.

More than twenty years ago Mr. Grove accurately forecasted Asheville's wonderful possibilities, and he has lived to see his strong faith in this region justified and his development plans, far-reaching as they were, all carried to great success in every instance. He possesses and holds the confidence of all who know him. He has stated that the growth and prosperity of Asheville is founded on its climate and scenery, and supporting this is the fine spirit and sterling worth of its citizens, and the untiring devotion to its welfare to which is attributed the rapid growth of this prosperous city from a small mountain village. That he believes Asheville is today on the threshold of its greatest era of development is evidenced by the fact that he will continue to develop the lands comprising Grovemont until all of his published plans are fully carried out.

Battery Park Hotel

Mr. Grove is very proud of the new Battery Park Hotel, and a great many of his friends who have seen the building and its furnishings have remarked that this hotel would impress anyone as having been built for a city of half a million people. He was heard to reply that the hotel was built for a city of half a million people and Asheville would soon build a city to correspond with the hotel.

An interesting feature in connection with the fitting out of the Battery Park Hotel lies in the fact that all the furniture in this building, 17 carloads of it, was manufactured in North Carolina, and illustrates, in a striking fashion, the co-operation he invariably accords native industry and trade. Mr. Grove believes in patronizing home industry, and applies this plan wherever it is feasible.

Battery Park Development

Visitors to Asheville recall the famous old Battery Park Hotel, a wooden structure perched on top of a small mountain in the center of the city. About four years ago Mr. Grove purchased the mountain and the hotel, also the deep, unsightly ravine or canyon penetrating the business center. The building was demolished and the mountain moved into the ravine, thus creating a large, level area in the business district. Here the new Battery Park Hotel was recently completed.

The effort cost Mr. Grove a large sum, but it created a great wealth of value in return for the outlay. Lots in the Battery Park area now bring $1500 to $2500 a front foot, and those on Coxe avenue, formerly the worthless canyon, sell readily at $600 a foot—thus at one bold stroke he created several million dollars in property values in the heart of Asheville's business area within a block of the Postoffice.

Today Battery Park, with its broad, level, brilliantly lighted, asphalt-paved streets—Page, O'Henry, Otis, Battle Square and Battery Park avenues—offers choice sites for stores, theaters and office buildings. Already the largest department store in Asheville, the Bon Marche, and the magnificent new Battery Park Hotel are located in this development and other buildings are being planned. Free parking space for 500 cars is proving an important factor in Battery Park business development.

Climate a Permanent Asset

In addition to St. Louis, where his son manages the Paris Medicine establishment, Mr. Grove and his wife maintain homes in Asheville and St. Petersburg. He is recognized as a great development factor in both North Carolina and Florida. According to Mr. Grove these two states, great as has been their progress in recent years, really are just now beginning their greatest period of progress.

Mr. Grove objects to printing his picture, although his stately figure, erect carriage and always pleasant, smiling countenance is the constant admiration of his many friends in all walks of life. He is also a man of few public utterances. One of these last summer was a statement to the tourists in Asheville and was as follows:

"Tourists now in Asheville are reminded that the one thing that is going to make big cities of Miami and St. Petersburg is the splendid winter climate; and the one thing that is going to make Asheville a city of a quarter of a million population is its unsurpassed summer and fall climate and scenery."

LEGEND OF SWANNANOA

Before the Revolutionary War, the beautiful Swannanoa River Valley in western North Carolina was declared a neutral hunting ground between the Cherokee and Catawba Indians, after many bloody battles were fought for this fairest of all Blue Ridge possessions. Great loss of life to each tribe resulted, until the chiefs held their famous peace council in the Garden of Eden, near Swannanoa—the Indian word for "beautiful."

Then came hunters, the first white men to cross the Blue Ridge into this section. In 1539 De Soto, too, journeyed here from Florida. In 1776 General Rutherford and his colony came to take charge of the Indians' famous possessions. They explored the Swannanoa, including that portion known as the "Garden of Eden," now being perpetuated in the survey of Mr. Grove's new town, Grovemont. Within a radius of 50 miles of this spot there are 64 peaks that are 6000 feet high, 23 of which are higher than Mt. Washington. These majestic mountains are covered with magnificent hardwood forests, and silvery streams dash down their slopes, forming crystal lakes in all directions around the "Garden of Eden," naturally a veritable riot of floral beauty.

Public Information Office

A source of great convenience to tourists and others is the ground-floor free information offices maintained at the expense of Mr. Grove, under the name of E. W. Grove Investments, at 89 Patton avenue, Asheville, for the general public interested in any part of Western North Carolina. It forms a great clearing house for reliable data to guide intending settlers or investors in this region. Here visitors are supplied with information about the opportunities in Western North Carolina, its lands and industries, city hotels, country boarding houses, mountain resorts, playgrounds, camps, and good roads which radiate this section. The free correspondence department answers thousands of inquiries from all parts of the United States and assists prospective visitors, settlers, or seekers of profitable investments, to acquire accurate information about this region of wonderful opportunity, splendid climate, and ideal conditions for long life and prosperity where enormous developments are already underway.

Greeneville, Tennessee

"The Jewel Town of the Mountains"

GREENEVILLE—HISTORICALLY

GREENEVILLE is wrapped round with a glorious cloud of tradition and history which gives the City an atmosphere of dignity and mellowness.

HOME OF THE SEVENTEENTH PRESIDENT OF THE UNITED STATES: Greeneville's chief claim to historical interest lies in the romantic career of Andrew Johnson, who rose from an humble tailor's bench to the highest office in the gift of the American people.

When but a boy Johnson came across the mountains and located in Greeneville. He had been a tailor's apprentice and he opened a little shop in Greeneville to ply his trade. When he married he could neither read nor write and his wife, who was Miss Eliza McCardle, taught him the rudiments of these two arts while he sewed.

Alderman and Mayor of Greeneville; Legislator, Congressman and Governor of Tennessee, he was elected Vice-President with Abraham Lincoln, whose assassination made Andrew Johnson President of the United States.

After his return to Tennessee he was elected to the United States Senate.

One of Greeneville's sun-kissed hill tops is crowned with a tall marble shaft that marks his last resting place. In the National Cemetery around this shaft sleep many soldiers.

The little old weather-beaten tailor shop, with its crude sign, "A. Johnson, Tailor," has been enclosed by the State in a beautiful building and is the shrine, each year, for thousands of Americans.

Tailor Shop of Andrew Johnson, Seventeenth President of the United States

FIRST CAPITOL OF STATE OF FRANKLIN: When the men of the western side of the Appalachian range decided to shake off the yoke of North Carolina and form a State, they declared themselves to be "Franks" or "Freedmen," and called the first Assembly of the new State of Franklin in Greeneville.

This city thus became the first capitol of the vanished State which was the predecessor of the State of Tennessee.

FIRST ABOLITION PAPER ESTABLISHED AT GREENEVILLE: The first abolition paper published in the United States was founded in Greeneville by Benjamin Lundy. It was called the "Emancipator."

THE OLDEST COLLEGE WEST OF THE ALLEGHANIES: In 1794, when Tennessee was yet almost a wilderness, Samuel Doak, a graduate of Princeton, came to Greeneville and founded Tusculum College, which is the oldest higher institution of learning west of the Alleghanies. Many little mountain boys have gone out from its doors during the past 150 years to become men, prominent in the work of the world.

BIRTHPLACE OF DAVY CROCKETT: Within a few miles of Greeneville is the spot where Davy Crockett, hero of the Alamo, was born. His immortal saying, "Be sure you are right, then go ahead," alone would entitle him to undying fame.

GREENEVILLE—INDUSTRIALLY

POPULATION: The City has a population of 5,200 by local postal census; it is the county seat of Greene county, which has a population of 40,000. The people are of Anglo-Saxon stock, with no foreign element. The principal occupation is agriculture, with such industrial labor as is now employed in the City drawn from the rural districts.

LABOR: Labor supply develops to meet employment offered. An existing knitting mill, employing 150 to 200 operatives, at first had difficulty securing sufficient operatives because it was new and the people were not informed as to employment of this sort. Now their supply is ample and labor turnover is very small. There are no organizations of labor. Many operatives are home owners and are an active part of the resident city population. It is estimated that an industrial labor supply up to 5,000 can be developed from county territory.

POWER: The local power company, operating a hydro-electric plant on the Nolachucky River, seven miles from the City, announces that it now has 3,000 horsepower available for new business, and that within 12 months will have 7,000 horsepower. Two additional sites on the same stream are being surveyed. The new developments will add not less than 30,000 horsepower to the amount of power available. Prices on this power will be furnished on request to the Greeneville Chamber of Commerce.

RAW MATERIALS: Iron, manganese, clays, marble, building stone, lead, zinc and high quality limestone are among the minerals available. Hardwoods, acid woods, chemical woods, walnut and cedar are to be had.

CHURCHES—SCHOOLS: Churches of all leading denominations. A system of graded and county high schools ranking the highest in the State covers the city and entire county.

ROADS: Three hundred miles of rock surfaced roads radiate from the city. Two State highways are in process of construction through the county, one east and west, the other north and south, crossing at Greeneville. Their completion will give full traffic connection with all adjoining States.

CLIMATE: Mild seasonal weather is characteristic. Average low summer temperature, July, 66; high, 79. Average low winter temperature, January, 32; high, 48. Average annual rainfall is 54 inches.

Greeneville is on the main line Southern Railway. All trains stop. Within one night's travel of all large cities east of the Mississippi.

In six years Greeneville has sold 49,169,426 pounds of Burley tobacco for $14,005,484.98.

Additional information about Greeneville will be gladly furnished by the Chamber of Commerce.

The Development of the Palm Beaches

IN South Florida, where the warm waters of the Gulf Stream kiss the golden sands of the Palm Beaches, an inspiring industrial drama is unfolding. On the beautiful Greater Palm Beach stage, under a broad canopy of soft Florida skies, thousands of sturdy men and courageous women drawn from all parts of the United States are playing important roles in the gigantic tasks of empire building. And as the wonderful panorama of the conquest of the wilderness unrolls before the eager eyes of ambitious and adventurous citizens everywhere, new forces and new minds and hands are rapidly being enlisted in the titanic struggle between the elements of nature and the needs of man.

The rapid transformation effected by the tremendous reservoir of cumulative effort being poured into constructive enterprises in West Palm Beach and Palm Beach is marvelous. To those acquainted with the slower movements of life in older settled communities the changes of a few months are almost past belief. Life in the Palm Beaches requires a complete readjustment of values. The span is quickened and shortened. Here a decade or less of community effort accomplishes as much as a generation of endeavor elsewhere. Back of practically all community betterments is the massed co-operative drive of the dynamic energy of many high-powered individuals drawn to this section from all parts of the Union. Great changes are inevitable when vision and man power and great natural resources are linked in combination for progressive achievements. A splendid record of accomplishment has already been written. But the movement is steadily gathering momentum and the changes of the next few years are apparently destined to far exceed even the unusual developments of the past five years.

Among the factors that build great cities are location, climate, food and water supply, opportunity for making a living, congenial community conditions and the invisible but all-powerful element of the spirit of the community itself. West Palm Beach and Palm Beach possesses this rare combination of conditions to an unusual degree for the ultimate development of one of the greatest cities of Florida. It is the natural trading center for one of the richest agricultural sections of the country and the international winter-resort capital for the social life of America as well. This presents a combination of economic conditions that makes for substantial, permanent growth, and eliminates the hazards of part time, seasonal occupations and activities.

The value of natural resources is largely dependent upon adequate transportation facilities. Greater Palm Beach is fortunate in having a location that will provide for strong lines of communication by highway, rail and water, not only with the Northern and Western markets of the Union but with the increasingly important Central and South American markets as well. With the tremendous volume of foodstuffs that will be produced here in the next ten or twenty years, millions of dollars of new wealth will be created, and that money will be handled and circulated mainly through the local financial institutions of Greater Palm Beach and the trading area it serves.

Already there is a broadening and strengthening of the arteries of communication. A brief year has witnessed a stupendous advance in actual highway, rail and water construction, of which any community might well be proud. On July 4 the Connor's Highway was opened, the first important link, from West Palm Beach to Okeechobee, in the cross-state highway between the East and West coasts of Florida. January 1, 1925, will usher in the completion of this first transverse road for south Florida between the Atlantic Ocean and the Gulf of Mexico. Thousands of annual visitors to Florida whose acquaintance with the state was hitherto limited to the section where they first landed, owing to the inconvenience of crossing from the East to the West coasts, will now be enabled to travel in comfort through one of the most inviting and beautiful sections of interior Florida. The resultant benefit to this territory through increased permanent population will be immeasurable.

A second cross-state highway south of Lake Okeechobee will, it is expected, be completed during 1925. This will run from West Palm Beach to Fort Myers. When finished it will enable the automobilist to swing round the loop of Lake Okeechobee, affording a complete and delightful tour over fine roads, and through some of the most picturesque and scenic country to be found in Florida.

January 1, 1925, will also see in operation a new rail-connection between the Palm Beaches and the outside world through the completion of the Florida, Western & Northern Railway, which will be operated by the Seaboard Air Line Railway. This will open up a great undeveloped agricultural area contiguous to the southern terminal West Palm Beach. Many thousand acres of rich farm land have been purchased by these railroad interests. A national advertising campaign will be conducted to attract new settlers. Many thousands of permanent farmers will be living in Palm Beach county as a

THE NEW ROYAL PARK BRIDGE, CONNECTING PALM BEACH AND WEST PALM BEACH.
"WHERE SUMMER SPENDS THE WINTER"

(Left)—Growing sugar cane in the Everglades, Palm Beach county, Florida. (Center)—Harvesting sugar cane in the Everglades, Palm Beach county, Florida. Right—A mill turning out sugar in the Everglades, Palm Beach county, Florida.

result of these railroad activities, and thousands of acres of land will be brought to a high state of productivity. The wealth coming from this source will be largely reinvested in the further upbuilding of the Greater Palm Beach territory.

The Florida East Coast Railway, to cope with the increased volume of passenger and freight business coming from its territory, will double-track its main line from Jacksonville to Miami. It will also build an extension of its branch line from Okeechobee to Miami, tapping the Western border of that section of Palm Beach county lying along the eastern shore of Lake Okeechobee. Greater Palm Beach will therefore have in another twelve months the equivalent of three new lines of railroad and two cross-state highways furnishing a complete system of trunk lines for the later laterals or branches to be built as the new country is further settled and developed.

The Palm Beaches are fortunate also in being able to develop an alternate water route for the shipment of its future agricultural and industrial products. Four miles north of West Palm Beach at a point known as Lake Worth inlet a short channel connects the Atlantic Ocean with Lake Worth. Dredging operations have already been carried in for opening up this channel to a present depth of twelve feet. On September 9 of the current year additional bonds were voted to continue the dredging operations to a depth of sixteen feet, also to provide for a turning basin in Lake Worth of 600 by 1000 feet and for the erection of docks. This will make a total expenditure of over one million dollars on the project. It is planned to have greater Palm Beach thus become a port of call for light-draft ocean steamers within another year and to continue the dredging for larger vessels as the increased tonnage justifies the investment. The present cost it is anticipated will pay for itself in a few years through the saving in reduced freight rates.

The potential available food supply that might be produced from the locked-up store of fertility in Palm Beach county lands will literally feed millions of people. Here in the Everglades, which are being rapidly reclaimed, is soil varying from two to twelve feet, which is as rich as the proverbial wealth of the land of the valley of the Nile. Under the favorable climatic and soil conditions it is possible and practical to produce in many cases three crops a year. Much of this winter produce can be raised at a season when crops command top market prices. Interesting experiments are being conducted with staples like sugar and peanut culture. It is predicted that in the near future the Everglades will become the sugar bowl of the United States. The ample rainfall annually, amounting to between fifty and sixty inches, usually comes at a time when most beneficial to crops.

The opportunities for making a living in the Palm Beaches are wide and varied. This is a young man's country, and the chances for a prosperous future depend largely on the energy, industry and initiative of the individual. But it is essential here as elsewhere to have sufficient capital ahead to tide over the period of readjustment.

The lure of greater Palm Beach is attracting a virile, energetic type of men and women from all over the world. Leadership and initiative are fostered under these inspiring conditions and fresh impetus given to many projects for community betterment and advancement. A live Chamber of Commerce and various service and fraternal organizations, like Rotary, Kiwanis, Exchange, Lion's and many other civic and fraternal societies, serve as a controlling and guiding influence for many movements for the community weal.

The history of Greater Palm Beach is in the making. Past performances are quickly forgotten. The citizens of this thriving progressive community are actively and aggressively absorbed in the tasks of the present and busily planning and building with the clear undimmed faith of youth for the future of the beautiful and glorious Greater Palm Beach that is to be.

OCEAN BATHING AT PALM BEACH IN MID-WINTER

Modern Scientific Methods Now Being Applied in Florida Orange Culture

Florida has been called the "Winter Playground of the Nation," but the far-sighted business men who are making it their home in winter are turning their attention to a greater extent every year to the great possibilities for wealth creation in the development of Florida's agriculture and citrus fruits. Individual investments have been made in large land areas and corporations have been formed for fruit growing. In some the stock is closely held and in others shares are offered the public to participate in enterprises which, if rightly managed, hold out possibilities of good returns on the investment.

Organization and co-operation are needed to place the citrus industry of Florida on a basis where a fair return will be received from the crop each year, instead of having the markets of the North glutted at different times through haphazard methods on the part of growers who, through the need of ready cash, force goods on the market before the market is ready to absorb it.

A great state is in the making. Cities and towns of the most modern type are springing up and developing at an enormous rate of progress. A wilderness of a few years ago is being transformed into a garden spot. Nowhere else is there a better opportunity for profitable investment, nor one in which greater actual enjoyment will be found. If you are in doubt, ask those who visit Florida each year. Ask them about the increase in Florida's wealth, Florida's opportunities and Florida's future. These things are apparent to everyone who comes here. They are no longer a matter of doubt or question, but are assured facts.

It is true there have been some failures to make good on expectations and on promises. Insufficient information on the part of individual investors has resulted at times in failure, but this is so everywhere in every line of business, and is due to incapacity on the part of the individual rather than any question as to facts which form the basis of Florida's growth.

Romance, sentiment and business have each in part attracted hundreds who have put their money in Florida's citrus fruits. As stated above, sometimes without definite knowledge of their new enterprise, these investors have not always planted the proper variety of fruit suited to the location, nor have they always adopted the best methods of culture. Experience is the best teacher, and the citrus industry of Florida is reaching a point where the grove owner appreciates the need of standardization in the kind of fruit to be planted, the quality of the product and in the way it should be packed.

Old methods are giving place to better, modern methods. These form the basis of our progress in all lines of endeavor. It is only another example of a problem being solved as Americans have a way of doing.

Four years ago a group of wealthy manufacturers of the East became interested in the possibilities to be gained by a thorough standardization of the citrus industry and, with the knowledge and success gained in their own operations elsewhere, they formed the Lake County Groves Corporation, which was incorporated under the laws of Florida.

This corporation, with offices at Eustis, Florida, owns 15,000 acres of the finest citrus lands in the state—not a low, flat country, but a beautiful rolling country in the center of Lake county, with 1400 lakes and many miles of asphalt roads. Twelve hundred acres have already been planted to groves and a five-hundred-acre unit is added each year.

Only standard groves of the finest quality are developed. Four varieties of fruit are used—two of oranges, one of grapefruit and one of tangerines. Each grove is planted to the same varieties, with a view of producing fancy, uniform fruit in large quantities.

Established warehouses in the big distributing centers of the North will enable the company to ship its fruit direct to the consuming public at good prices.

Such a standardization of a citrus product will be a great asset to the state of Florida and to the whole South. It will mean better fruit for the consumer and larger profits for the grove owner.

Groves are sold in ten-acre tracts and are now available to investors. The Lake County Groves Corporation will assume the care of all groves and market the fruit, relieving the owner of all worry in this connection. As the cultivation of a large acreage under one management permits the work to be done in a better manner and at smaller cost, uniform fruit is produced at larger profit than would be possible under individual cultivation.

More detailed information can be secured by addressing the Lake County Groves Corporation, Eustis, Florida.

Carleton Terrace, Overlooking Indian River, Reflects the Beauty of Florida's East Coast

Sixty Foot Elevation Furnishes Romanceful Setting Near the Ocean

Down on the East Coast of Florida, just half way between Jacksonville and Miami, is Cocoa, a rapidly growing, progressive city overlooking the picturesque Indian River and the broad blue-green Atlantic. And here on a sixty-foot elevation lined with palms and oaks and flowers is Carleton Terrace, a home suburb with a natural setting that has captured the beauty loving instinct of thousands motoring down from states above.

Carleton Terrace, while less than one year old, is now one of the most completely developed home suburbs in Florida. Winding roadways curve about throughout the property and ornamental street lights, concrete sidewalks, pure clear bubbling water and all other modern improvements and conveniences have been provided. Today thirty-two beautiful homes are under construction and others are planned for building before the close of the present season.

D. P. Davis, president, and M. H. Davis, manager of the United Realty Company, selected Cocoa for this distinctive development after inspecting the entire stretch of Florida's East Coast. Nowhere else was found such natural beauty; nowhere else was found a city with such remarkable opportunities for growth and development.

In Miami the owners of Carleton Terrace had developed Shadowlawn, Bellaire, Alta Vista, Biltmore, Biltmore Court, Shadowlawn Extension and Brickell Hammock—all extensive projects, now completed and peopled with thousands of distinguished homes and discriminating residents. D. P. Davis, president, is also head of the D. P. Davis Properties, owners and developers of Davis Islands, Florida's $30,000,000 project in Tampa Bay.

Cocoa is on the main line of the Florida East Coast Railway, thirty-six hours from New York and Detroit, and one of the most delightful winter resorts in Florida. Smooth asphalt roads lead north to Jacksonville, south to Palm Beach and Miami and connect with cross-state highways leading to all parts of the state.

Construction work in Cocoa is progressing rapidly, with more than $1,000,000 spent in public and private improvements this year. In this program have been included two quarter million dollar hotels, a casino and bath house on the beach, Masonic Temple, handsome new theatre, one of Florida's finest golf courses and many new homes and business structures.

Excellent public schools and churches, a beach 200 feet wide and twelve miles in length, ocean bathing, tennis, boating, fishing and every sort of sport and pleasure are here for the visitor and year-round resident.

Carleton Terrace is two miles from Cocoa, on the romanceful Indian River, and is crossed by the Dixie Highway, the main avenue of travel on the East Coast over which thousands of motorists drive each year. Beginning at the river boulevard, which is on an elevation of fifty feet above the lazily flowing river, Carleton Terrace stretches westward, gently sloping upward. Here each home place reaches up into the skies, looking out onto the water, toward the ocean in the distance.

Carleton Terrace, with its wondrous natural beauty, presents an unusual opportunity for profitable investment. Cocoa is building northward and this highly restricted home suburb is directly in the path of rising values. Thousands of persons will drive through and inspect this property during the coming winter season. Many of them will find here the beauteous surroundings, equable climate and perceptible opportunities that will decide them to become permanent citizens or yearly winter residents.

Here is a city with delightful living conditions, a business city building substantially for an assured future—where investments are yielding ready profits and where environment favors almost every enterprise. And Carleton Terrace, Cocoa's most beautiful subdivision—sixty feet above the Indian River—typifies the spirit of Cocoa. For here is Florida's renowned winter sunshine and summer's cool clear days—here are health and cheer, recreation in every form of sport and game—a magic winter playground in a garden by the sea.

Additional information in regard to Cocoa and Carleton Terrace may be obtained from the United Realty Company, Brevard Building, Cocoa, Florida.

Alcohol—Why?

Alcohol for industrial purposes and the use of this very important chemical raw material, as well as the development of derived products and by-products of the alcohol industry are essential prerequisites to any substantial development of chemical industry in America.

Denatured alcohol and pure alcohol as a chemical raw material did not exist in the United States prior to the passage of the tax-free industrial and denatured alcohol act of 1906. Prior to that date all ethyl alcohol carried the heavy Internal Revenue Tax which customarily attached to alcoholic beverages, as a consequence of which there could be no development of a legitimate alcohol industry as a foundation for the great variety of chemical processes and products which might be based thereon.

The year following the passage of the Industrial and Denatured Alcohol Act, eight plants in the United States produced 1,780,000 gallons of alcohol for industrial purposes. During the past year seventy-six industrial alcohol plants operated in the United States and produced approximately 58,000,000 gallons of industrial and denatured alcohol. The consumption of denatured alcohol as an anti-freeze mixture in automobile radiators during the past year was more than ten times the total production of denatured alcohol for all purposes during the first year of the tax-free alcohol law.

The developments of the plants, equipment and organizations for the manufacture and distribution of industrial alcohol to keep pace with the rapid growth of this industry and the chemical industries depending upon alcohol as a raw material has been a substantial factor in the industrial development of the South.

The U. S. Industrial Alcohol Co. is the pioneer company in the manufacture of industrial and denatured alcohol, and has kept pace from the beginning with the tremendous growth of this industry. Its principal plants are located in the South, notably at Baltimore and New Orleans. The Baltimore plant is the largest in the world devoted exclusively to the manufacture of industrial and denatured alcohol. It is more than five times the capacity of the largest alcohol plant in Europe. A corresponding producing capacity is located on the water-front in New Orleans.

The raw materials for the operation of these plants, such as molasses, oil for fuel, etc., are received at the docks of the company's plants direct from ocean-going steamers, and finished products are shipped by rail, water or local freight. The company operates its own tank car lines for the shipment of its products.

The U. S. Industrial Chemical Co. affiliated with the U. S. Industrial Alcohol Co. is located at Baltimore. The plants of this company occupy approximately 100 acres, representing an investment of several million dollars devoted exclusively to the manufacture of chemicals and products derived from alcohol as well as by-products from the waste of the alcohol industry.

The layman would hardly recognize the ether and ethylene used in surgery; the isobutyl alcohol used in the manufacture of artificial musk; the ethyl acetate used as a solvent in the manufacture of artificial leather; the refined fusel oil used in the manufacture of moving picture films; the tincture of iodine, the approved antiseptic; the vinegar used in the manufacture of food products; the ethyl aceto acetate used in the manufacture of fast yellow dye; the ethyl lactate used as a softener in the coatings of airplane wings; amyl acetate used as banana flavor in soda fountains; the acetone used as a gelatinizing agent in the manufacture of high power smokeless powders; the ammonia and potash salts used as plant foods; concentrated molasses residue used as a binder in fuel briquettes; and innumerable other varied products as derived from or associated with the alcohol industry. These and a great

BALTIMORE WORKS—U. S. INDUSTRIAL ALCOHOL CO.

variety of other chemicals of basic importance to the every-day life of the nation are turned out in great quantities by the U. S. Industrial Chemical Co.

Alcohol occupies such an important place in the scheme of war that it was classed by the War Industries Board as a basic industry. Every pound of smokeless powder requires for its production a half pound of alcohol, and every pound of mustard gas requires a pound of alcohol. Acetic acid, methyl acetate and acetone, basic chemicals in the aircraft program, were produced synthetically as a war measure in tremendous quantities, from alcohol.

The facilities of the Baltimore and New Orleans plants of this company were increased and operated at maximum capacity throughout the war, in the production of alcohol and derived products for war purposes, for the United States Government and its allies. Solid trains of tank cars of alcohol were moved under special war orders from the plants of this Company to meet the needs of the war program.

One of the outstanding romances of chemistry is the production of alcohol for the industrial needs of civilization, whether it be at war or at peace. Starting with the cane fields of Louisiana, Hawaii or Cuba, the beet fields of the middle West, through molasses as a by-product of the great sugar industry, transported by tank cars and tank steamers to the alcohol plants, where the sugar is converted by fermentation into alcohol and carbonic acid gas, for their many and varied industrial uses, the much maligned alcohol now becomes the basic material for artificial silk, pharmaceutical products, flavoring extracts, perfumes, synthetic chemicals, artificial leather, lacquers and varnishes, photographic films, surgical supplies, anaesthetics, smokeless powder, liniments, and literally thousands of other products, in daily industrial, commercial and household use. The cycle is completed by making from the unconvertible portion of the molasses, plant foods in the form of potash and ammonia, and returning them to the soil in the form of mixed fertilizer.

The chemical industry of a nation can be accurately measured both as to rate and extent of its development, by its use of ethyl alcohol for industrial purposes. The growth of chemical industry, and as a consequence of that growth, the development of chemical education in Germany, is attributed to the far-sighted liberality of that country in its attitude towards the basic alcohol industry.

On the other hand, the backward development of chemical industry both in the United States and Great Britain is likewise attributable to the failure, in both of these countries, to recognize the basic character of the alcohol industry and to their reluctance to liberalize restrictions and permit its development. While Germany encouraged and subsidized the development of alcohol production for industrial uses, Great Britain and the United States restricted and prohibited until it was too late and until the German chemical industry dominated the world. Even now with the basic and fundamental character of industrial alcohol well understood by the technical talent of the nation, the industry is being restricted and hampered in its development by well intentioned but poorly advised legislation and regulation directed to the prohibition of intoxicating liquors.

The official and the public mind is continually confused as to the difference between alcohol for legitimate industrial uses and intoxicating beverages in which alcohol, unfortunately, is a constituent. The great social experiment of prohibition is being confused with the economic and industrial necessities of a basic chemical industry. Constructive industrialists are sound and the law is clear, on the subject of industrial alcohol, but the public and official mind is clouded.

This confusion, unless corrected, is bound to affect the ultimate development of American chemical industry. Without a great American industry there can be no hope of economic independence such as we enjoy in steel, copper and agriculture. National defense in future wars must depend almost wholly upon chemical munitions, and every citizen and every official should ask himself and answer the question as to what will become of the nation which has failed to provide itself with a dominating chemical industry.

BALTIMORE WORKS—U. S. INDUSTRIAL CHEMICAL CO.

"My Winter Vacation"

Ten years ago that was said only by the very rich, the pretending-to-be rich, or the retired.

The business man of today leads a much more strenuous business life than that of ten years ago. The speed of the automobile, the greater use of the telephone, aeroplane, mail and other time savers have enabled today's business man to crowd into a business day, the accomplishments that once took twice that time.

Working at this high speed necessitates a longer period of rest than the two weeks' summer vacation that once sufficed.

Then, too, the dweller in the North has awakened to the realization that it is far more enjoyable to get away from the continuous cold and unpleasantness of the northern winter than the occasional heat of the northern summer.

"My winter vacation" is now so necessary and so desirable that tens of thousands each winter get out their stored-away golf sticks, pack their sport suits and flannels, and leave ice, snow and pneumonia behind for the sun-kissed ocean shores of Miami Beach in South Florida.

Miami Beach has become America's Winter Playground. With the Gulf Stream but three miles off its sandy beaches, ocean bathing is more enjoyable at Miami Beach in winter than in the North in summer. Three of Florida's best golf courses, wonderful polo drives, and with half a dozen of Florida's greatest hotels, Miami Beach has become the winter meeting place of America's celebrities.

Each winter sees the hotels, the apartments and the homes, both great and small, all filled to overflowing by those who have come to learn that life at Miami Beach is most wonderfully pleasant, and that it's well worth while to go to Miami Beach for "your winter vacation."

Any information, either in advance of your arrival, or while you are here, will gladly be supplied by The Carl G. Fisher Properties, Miami Beach, Fla.

A VIEW OF THE BEACH AND CASINO, MIAMI BEACH, FLA.

TRADE JENKINS MARK

Fig. 106. Standard Bronze Globe Valve

Fig. 720. Bronze Rapid Action Valve

Fig. 352. Standard Bronze Swing Check Valve

Fig. 750. Bronze Marine Valve

Fig. 715. Bronze Fire Line Valve

Fig. 128. Extra Heavy Bronze Globe Valve

Fig. 168. Bronze Radiator Angle Valve

Fig. 370. Standard Bronze Gate Valve

Fig. 142. Standard Iron Body Globe Valve

Fig. 325. Standard Iron Body Gate Valve

Fig. 331. Standard Iron Body O. S. & Y. Gate Valve

Fig. 293. Automatic Equalizing Stop and Check Valve

Sixtieth Anniversary

Jenkins Valves

1864-1924

In 1864, Nathaniel Jenkins invented the Jenkins Valve. Since that time the manufacture of Jenkins Valves has steadily grown, and today these valves are widely used not only throughout America, but in all parts of the World.

It is with gratification that Jenkins Bros. look back over this long period of years, knowing that not once has the manufacture of an inferior article been undertaken for the sake of temporary profit—a policy that, in no small measure, is responsible for the service and satisfaction which the engineer and valve user has learned to expect from Jenkins Valves.

These valves are made to the highest standards. Every detail of design has been carefully worked out and is determined by a thorough knowledge of valves and valve requirements; only the best grade of metal is used, and throughout the process of manufacture every precaution is taken to produce perfect valves—valves which are rigidly tested, and fully guaranteed in the service for which they are recommended. Nation-wide distribution, through supply houses everywhere, carries Jenkins Valves to every locality.

It pays to install a good valve first

A large number of all Jenkins Valves sold is for replacement work. That is, Jenkins Valves are installed in buildings, sometimes a year or several years after erection, because valves of cheap manufacture have given trouble when subjected to constant service.

Replacements mean not only practically doubled valve cost, but also the expense of tearing out piping to remove troublesome valves and labor cost of installing new ones. Futhermore, a big loss is frequently incurred due to interrupted plant operation. It pays to install Jenkins Valves first, as is the practice of owners who seek building economy.

JENKINS BROS.

80 White Street, New York, N. Y. — 133 North Seventh Street, Philadelphia, Pa.
524 Atlantic Avenue, Boston, Mass. — 646 Washington Boulevard, Chicago, Ill.

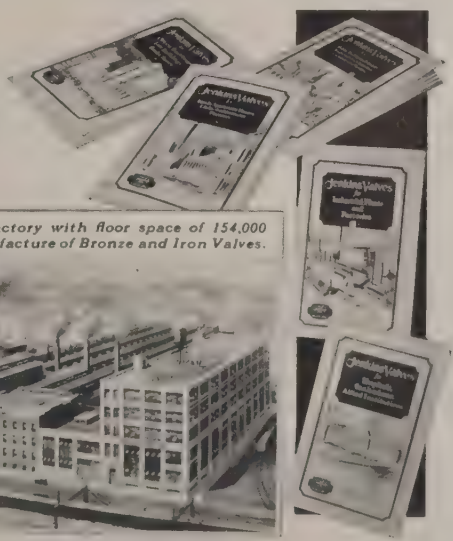
JENKINS BROS., Limited

Montreal, Canada — London, England

Factories: Bridgeport, Conn. — Elizabeth, N. J. — Montreal, Canada

Booklets for you

Jenkins Valves are made for the power plant, heating, plumbing and fire protection service. We shall be pleased to mail you a booklet descriptive of Jenkins Valves in the type of building in which you may be intetested. It also lists some of the prominent buildings in the South in which these valves are installed.



Jenkins Bros., Bridgeport, Conn., factory with floor space of 154,000 sq. ft. devoted exclusively to the manufacture of Bronze and Iron Valves.

This Bank Wants You to Know—

THAT its aim—the keynote of its career—is to help deserving business.

Its directors are men picked from twenty lines of business.

They know the problems and perplexities of present day business operations.

Its officers and employes are students, not alone of the science of banking, but of ways to be helpful to the bank's customers.

Our cordiality is *not* assumed.

We invite your business if you need banking facilities.

You will find here an ability and a willingness to serve that explains why we have 16,000 customers, who are our *friends*.

Baltimore Commercial Bank

GWYNN CROWTHER, *President*

PRATT STREET and MARKET PLACE

BALTIMORE MARYLAND

RESOURCES OVER TEN MILLION DOLLARS

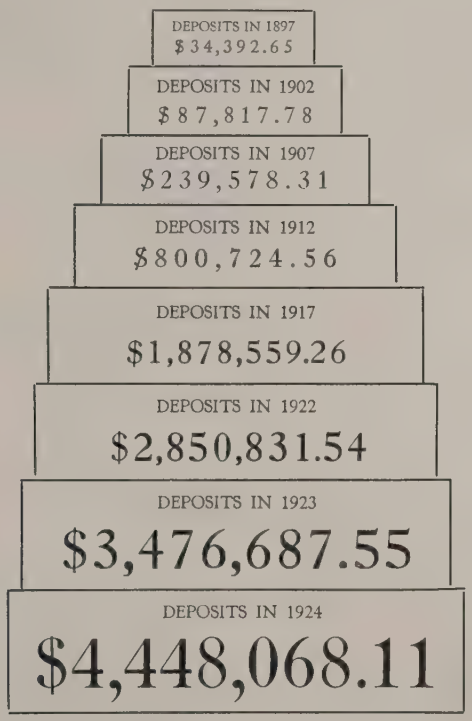
Member Federal Reserve System

ALONG WITH THE PROGRESS OF OTHER SOUTHERN CITIES

THE GROWTH OF

DAYTONA

—on the East Coast of Florida—has been rapid but substantial



THE ABOVE RECORD OF THE DEPOSITS OF THE MERCHANTS BANK AND TRUST COMPANY

–located in this beautiful city—furnishes a barometer of the growth of the community

Merchants Bank and Trust Co.

DAYTONA, FLORIDA

F. N. CONRAD, *President* F. J. NIVER, *Executive Vice President* A. N. OTIS, *Cashier*

Under the same management ATLANTIC BANK AND TRUST COMPANY, Daytona Beach, Fla.

The South's Most Northern City---

IN addition to Cincinnati's municipally owned railroad—the Cincinnati Southern—there are 18 other railroads radiating from Cincinnati in all directions, which makes this city an ideal distributing point.

Products from the South move North to Cincinnati and from this great distributing point they radiate to all points North, East and West.

Conversely, the same is true as to the movement and the distribution of the products of the North, East and West to the Southern States.

The saving of time and money to firms distributing their products from this great central point is a vital factor in the conduct of their business.

Write for particulars to
Cincinnati's Largest Banking Unit

FIFTH-THIRD-UNION TRUST BANKS

The Fifth-Third National Bank-Cincinnati — The Union Trust Co. Cincinnati

COMBINED RESOURCES OVER
EIGHTY-SEVEN MILLION DOLLARS

IN GEORGIA---

"Just at this time I desire to add that your bank has contributed advertising space and service very freely for the upbuilding of this section of our country and deserves credit and thanks for that which you have done."

"We wish to commend your bank for bringing this information within the reach of the other banks of the state."

"From time to time I have noticed the splendid educational work of your institution. You are to be congratulated not only upon your business showing, but upon the leadership in things of general interest which you have taken in your section."

From letters from Georgia Banks

IN CLOSE TOUCH WITH GEORGIA AND THE SOUTH-EAST, THE FOURTH NATIONAL BANK OF MACON CAN BEST SERVE YOU IN THIS TERRITORY.

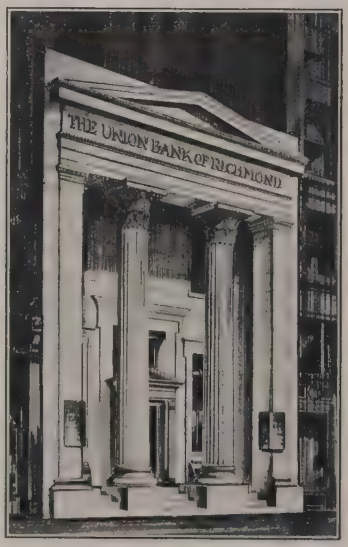
FOURTH NATIONAL BANK

MACON, GEORGIA

BACK in 1837, Main Street stopped its business, and the guests at the old Globe Tavern opposite stood on their toes to watch the long, heavy haul from the dock of the two solid stone columns which today present their staunch, unchanged fronts from the portico of the *Union Bank.*

The flames that swept Richmond in April, 1865, gutted the back portion of the Bank building, but through every vicissitude these columns have held and stood upright.

Today, the grandchildren of the early customers of The Union Bank pass between these venerable columns and find awaiting them the faithful and unfailing service which their forefathers knew and praised.



The Union Bank

of Richmond, Va

GEORGE W. CALL
Chairman of the Board

C. C. BARKSDALE
President

M. D. WALKER
Cashier

SAFE DEPOSIT AND TRUST COMPANY

of BALTIMORE

CHARTERED 1864

Capital, Surplus and Profits, over $4,738,000

ACTS as Trustee, Receiver, Attorney and Agent—being especially organized for careful management and settlement of estates of every description.

Acts as Trustee of Corporation Mortgages, Fiscal Agent for Corporations and Individuals, Transfer Agent and Registrar.

Depositary under plans of reorganization.

Securities held for safe keeping for out-of-town Corporations and Persons.

Fireproof building with best equipment for safety of contents—used exclusively by the Company.

Safes for rent in its large fire and burglar-proof vaults, with spacious and well-lighted coupon rooms for use of patrons.

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JOHN W. MARSHALL
JOHN J. NELLIGAN
ROBERT GARRETT
GEORGE C. JENKINS
HOWARD BRUCE
MORRIS WHITRIDGE

OFFICERS

H. WALTERS, Chairman of Board

JOHN J. NELLIGAN, President
JOHN W. MARSHALL, Vice-President
ANDREW P. SPAMER, 2nd Vice-President
H. H. M. LEE, 3rd Vice-President
JOSEPH B. KIRBY, 4th Vice-President
GEORGE B. GAMMIE, Treasurer
CLARENCE R. TUCKER, Asst. Treas.
JOHN W. BOSLEY, Asst. Treas.
ARTHUR C. GIBSON, Secretary
WILLIAM R. HUBNER, Asst. Secretary
R. S. OPIE, Asst. Secretary
ALBERT P. STROBEL, Real Estate Officer
ROLAND L. MILLER, Cashier
GEORGE PAUSCH, Asst. Secy. and Auditor.

W. E. SMALL, *President* E. P. AMERINE, *Secretary*

GEORGIA CASUALTY COMPANY

General Offices: ATLANTA, GEORGIA

INCORPORATED UNDER THE LAWS OF THE STATE OF GEORGIA

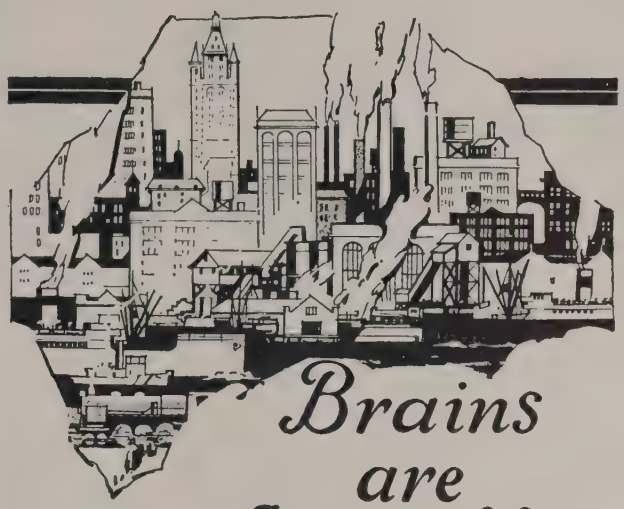
Capital Stock, $500,000
Surplus and Reserves for the Protection of policy-holders, over $3,000,000

WRITING THE FOLLOWING LINES OF CASUALTY INSURANCE

Automobile Liability
Property and Collision Damage
Plate Glass
Elevator Liability
Teams Liability
Owners' Protective
Contractors' Protective
Merchants' Protective
Manufacturers' Protective
Bottlers' Protective
Workmen's Compensation
Public Liability — All Lines
Physicians' Liability
Dentists' Liability
Druggists' Liability
Employers' Liability
Theatre Liability
Residence Burglary
Safe Burglary
Workmen's Collective

It maintains at all times full legal Reserves computed under the laws of New York, Pennsylvania and Georgia.
It has an unusually high ratio of assets to liabilities—a factor denoting financial strength, permanence and stability unsurpassed by that of any company.
It does business in 39 states and its premium income exceeds $3,250,000.
It has paid out in losses during the past fifteen years over $12,000,000.
It has everything that constitutes a well-balanced company and offers to its clientele Efficiency, Service and Protection.

Georgia Casualty Company

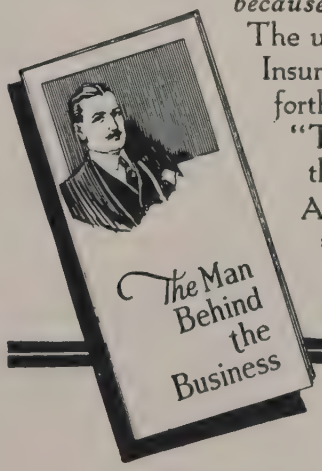


Brains are Insurable

against the inroads of death, just as merchandise and buildings are insurable against loss from fire. The loss of a valuable life from a "going" business is far more serious than a fire loss, *because it is irreparable.*

The uses of Business Life Insurance are clearly set forth in a new booklet "The Man Behind the Business"

A copy will be sent to any individual, firm or corporation on request.

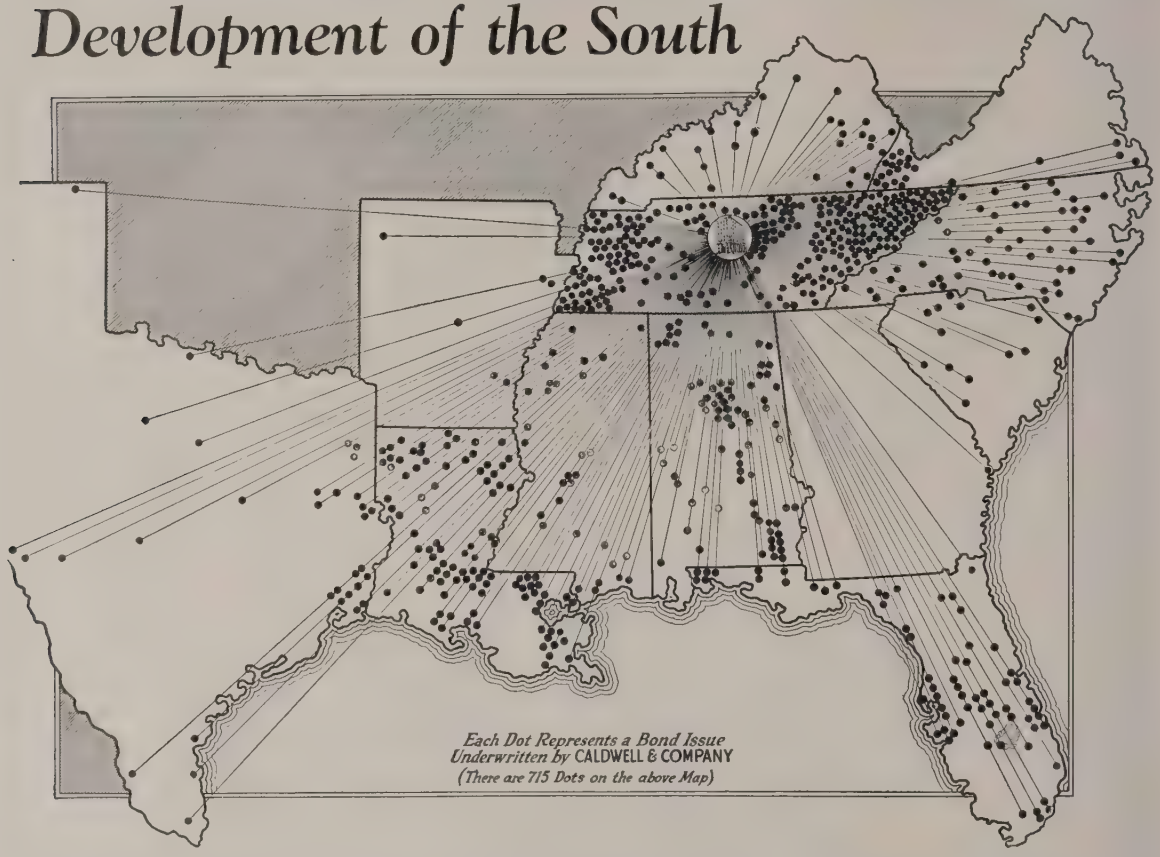


The Equitable Life Assurance Society

of The United States

393 Seventh Avenue NEW YORK, N. Y.

A Substantial Factor in the Progressive Development of the South



Caldwell & Company, investment bankers, have had the privilege of playing an important part in financing Southern progress. Over 700 Southern bond issues, amounting to many millions of dollars, have been bought and sold by this company.

CALDWELL & COMPANY have been the means through which hundreds of Southern cities, towns and counties—large and small, near and remote—have received funds for needed improvements. With its offices in the North and East, one part of this organization has reached into the financial centers of the country while the other has turned the money there received over to the progressive city, town or rural community which could not otherwise have obtained the funds necessary for proper growth and public welfare.

Schools, highways, streets, water and light plants, hotels, apartments, drainage systems, public institutions, office buildings, factories, theatres, hospitals, churches—these are some of the works which Caldwell & Company have helped to build.

In these achievements of the South this investment house feels a particular pride. . . . And with a pride perhaps a little more personal, they point to the fact that out of the hundreds of bond issues dotted on the map above, representing the business of Caldwell & Company from their first underwriting to the present day, not a single bond issue has defaulted in the hands of a purchaser.

Those interested in sound Southern Investments or in obtaining the services of a leading Southern Investment House in financial matters, should write for a copy of the booklet, "Investment Bankers of the South."

CALDWELL & COMPANY

Nashville
New York
Chattanooga
Chicago
Knoxville

Investment Securities

400 Union Street *Nashville, Tennessee*

Detroit
Birmingham
St. Louis
New Orleans
Cincinnati

West Virginia

JUST a few years ago every person not acquainted with the state looked upon West Virginia as a wilderness inhabited by people accustomed to the rough and rustic life. And they were hardy, sturdy, honest, patriotic people, the people to whom George Washington referred when he spoke of planting a banner of freedom on the hills of West Augusta and rallying around him an army which would defend it forever.

No state has shown greater strides in development, intellectual, civic and commercial than the State whose motto is: "*Mountaineers are always free.*"

West Virginia has been called the "*Nation's Power House,*" because its coal is turning the wheels of industry on both land and water. It is behind the battle line with fuel energy, in the form of oil, gas, coal and lumber, and in foods from orchard, garden and field that West Virginia is following the prediction of the "*Father of his Country.*"

Bluefield, West Virginia, is located in the southern extreme of West Virginia on Norfolk & Western Railway, being the largest city adjacent to the celebrated Pocahontas Coal Fields. Boasts of the finest hotel in West Virginia, *The West Virginian*, 240 rooms, 240 baths. Entertained eleven state conventions and National Retail Coal Men's Convention during 1924. Twentyseven hundred feet above sea level. Cool nights and delightful climate all year around. This bank would welcome your inquiry and get you such information as you may desire.

Come To See Us.

THE BLUEFIELD NATIONAL BANK BLUEFIELD W. VA.

ALEXANDER HAMILTON
A Founder of the Bank of New York in 1784

A Tribute to Achievement

THE South's remarkable development in the last fifty years reflects virile production and merchandising methods supplemented by the wise use of banking facilities. The achievements of this period justify expectations of greater things in the future—larger growth of manufacturing, agriculture and municipal improvements.

With pride in the confidence which Southern business men and bankers have long displayed in this Bank, we offer full banking coöperation in developing the South of today and the Greater South of tomorrow.

Bank of New York & Trust Co.

Capital, Surplus and Undivided Profits
Over $16,000,000

New York, N. Y.

SANFORD
NORTH CAROLINA

THE only town in North Carolina served directly by the three trunk line railroads of the South.

Labor is plentiful. Power is cheap. Coal mines within six miles.

Forty minutes from the famous Sandhill Peach Belt and PINEHURST, the winter playground of thousands of tourists.

We have these advantages to offer together with a strong banking institution with resources of over five million dollars.

For further information write

THE PAGE TRUST COMPANY
SANFORD, N. C.

MONTGOMERY
ALABAMA

A complete financial service:

The First National Bank
The First Finance Corporation
The First Joint Stock Land Bank

Combined Resources
$10,975,142

All of these Institutions
Owned by the Shareholders of

The
First National Bank
of Montgomery, Ala.
ORGANIZED 1871

Capital	$1,000,000
Surplus and Profits .	500,000

SOMETHING TO THINK ABOUT

Last Year the State of LOUISIANA produced:

357,000	Bales of Cotton	Worth	$42,782,000
656,913,000	Pounds of Sugar	Worth	39,414,822
408,400	Barrels of Molasses	Worth	4,084,000
1,755,000	Bushels of Irish Potatoes	Worth	2,632,000
7,820,000	Bushels of Sweet Potatoes	Worth	4,770,000
29,002,000	Bushels of Corn	Worth	24,072,000
19,980,000	Pounds of Rice	Worth	17,782,000
363,000	Tons of Hay	Worth	4,774,000
143,409,000	Acres of Truck and Vegetables	Worth	12,082,000
1,106,000	Tons of Sulphur	Worth	10,859,220
32,850,915	Barrels of Oil	Worth	53,236,770
	Timber Products	Worth	17,129,221
	Carbon Black	Worth	4,375,000
	Sea Foods	Worth	10,574,333

LOUISIANA has:

365 days growing weather in year.
Greatest Sulphur Mines in World.
Greatest Salt Deposits on Western Hemisphere.
Leads in production of Sugar Cane and Rice.

Our service covers the entire field of Banking, Trust and Investment Business. Our entire Organization's duty and privilege is to be useful to our correspondents and to the public.

YOUR BUSINESS INVITED

WHITNEY-CENTRAL BANKS

NEW ORLEANS — Capital and Surplus, $6,000,000 — LOUISIANA

The CAROLINA NATIONAL BANK

of COLUMBIA, S. C.

"THE OLD RELIABLE"

CAPITAL - - - - - $300,000.00
SURPLUS PROFITS - - $175,000.00
TOTAL ASSETS - - $5,165,000.00

EFFICIENT SERVICE GUARANTEED

W. A. CLARK, *Chairman*
JOSEPH M. BELL, *President*
R. S. DES PORTES, *Vice-President*
JNO. D. BELL, *Vice-President & Cashier*

When you choose

IN choosing your bank there are two vital requirements to consider—Courteous Service and Sound Strength.

Of course, courteous service is a hackneyed expression, but at The First Huntington National it means complete banking service plus a doubled extra measure.

With resources approximating twenty million dollars The First Huntington National enjoys a sound strength that is unequalled by any bank in West Virginia.

The First Huntington National Bank

First in Strength :: First in Service

HUNTINGTON, WEST VIRGINIA

A Southern Bank

Familiar With Southern Conditions and Credits Since 1865

offers its broad facilities to Southern Manufacturers, Merchants and Individuals and to those concerns located elsewhere doing business in the territory which it serves. Correspondence invited.

FIRST National Bank *of* Richmond, Va.

John M. Miller, Jr., Pres.

RESOURCES OVER $32,000,000.00

The
First National Bank
BIRMINGHAM ALABAMA

DEPOSITORY OF THE UNITED STATES AND THE STATE OF ALABAMA

Capital $1,500,000
Surplus and Profits over 3,000,000
Resources over 38,000,000

ACCOUNTS of banks, bankers, corporations and firms received on favorable terms. Correspondence invited with those who contemplate making changes or opening new accounts.

Oscar Wells, *President*
J. K. Fleming, *Vice-Pres.* — W. D. Robertson, *Asst. Cashier*
Thomas Bowron, *Vice-Pres.* — W. C. O'Ferrall, *Asst. Cashier*
K. W. Berry, *Vice-Pres.* — Paul Angell, *Asst. Cashier*
F. S. Foster, *Cashier* — J. A. Holcomb, *Auditor*

TRUST DEPARTMENT
BOND DEPARTMENT
SAVINGS DEPARTMENT

DOMESTIC AND FOREIGN EXCHANGE
SAFE DEPOSIT AND STORAGE VAULTS

CHARLESTON
WEST VIRGINIA

WITH two-thirds of the population and three-fourths the area of the entire state within a 100-mile radius, Charleston's strategic position makes it the logical center of the Great Kanawha Valley.

Located at the confluence of the Kanawha River, a year-around navigable stream, and with abundant fuel and low transportation, it is but natural it should boast over 70 large and varied manufacturing plants, employing normally more than 12,000 persons, to say nothing of the thousands employed in its great mining industry.

This half-century-old bank offers ample resources, experienced counsel and comprehensive service to firms or individuals contemplating a relationship in Southern West Virginia.

KANAWHA VALLEY
CAPITAL $500,000.00 BANK SURPLUS $1,600,000.00
CHARLESTON WEST VIRGINIA

Miami---

With a building total which will exceed $15,000,000.00 for the year 1924, Miami is amazing the entire country by the consistency of its growth and progress.

Its potential possibilities are unlimited; its continued prosperity is assured. As Miami's oldest banking institution, we invite requests for information.

BANK *of* BAY BISCAYNE
MIAMI'S OLDEST BANK MIAMI, FLORIDA

Inland Empire
OF THE
SOUTH

Industrial, Commercial and Geographical Center of a Great Section.

Natural resources almost unlimited, and because of its vast Hydro-Electric possibilities, it will become the metropolis of a wonderful industrial life.

Banking facilities are keeping pace with its marvelous growth.

We are fully equipped and will handle your business promptly and accurately.

Union National Bank
GAY AND COMMERCE STS.
KNOXVILLE, TENNESSEE

THE
Peoples National Bank
OF CHARLESTON, S. C.

HAS always prided itself upon the scope and the sustained quality of its service.

It is fully equipped to care for Bills of Lading with Drafts, Acceptances and Collections with the efficiency developed by fifty-nine years experience.

We welcome an opportunity to demonstrate what our service may mean to you.

The Peoples National Bank
Oldest National Bank in South Carolina

East Coast Bank & Trust Company

DAYTONA BEACH, FLORIDA

Resources a Million and a Quarter Dollars

THE oldest and largest Bank on the Peninsula. More than two thousand five hundred satisfied Patrons. Our banking policy is progressive and the Board of Directors is composed of successful business men with keen judgment and foresight. This institution gives a complete banking service — Investments, Loan, Bond, Travel, Foreign Exchange, Safe Deposit and Trust. Centrally located in the business district of the city and in position to serve our patrons promptly and in an efficient manner.

Financially Strong — Progressive in Policy
Efficient in Service

OFFICERS

JOHN F. WALTER - President
N. P. YOUNG - Vice-President
W. H. COURTNEY - Vice.-Pres.
URA EMBRY - Exec. V.-Pres.
D. A. WESTON - - Cashier
E. V. DICKMAN - Asst. Cash.

DIRECTORS

J. W. Camac N. P. Young
J. R. Anthony
Loring E. Holmes L. E. Hoeye
W. H. Courtney
John F. Walter Ura Embry
D. A. Weston

OLDEST TRUST COMPANY IN VOLUSIA COUNTY

EIGHTEEN YEARS
of faithful service has made the

Continental Bank and Trust Company

an essential part of Shreveport's business machinery

The broad facilities and unquestioned safety which have contributed so largely to the community's progress will help to make your business a bigger and a better one

CONTINENTAL BANK AND TRUST COMPANY

SHREVEPORT, LA.

MEMBER FEDERAL SYSTEM

1869 1924

The FARMERS BANK *of* NANSEMOND

SUFFOLK VIRGINIA

The Oldest and Largest Bank in the City

Capital Paid In - -	$20,000.00
Capital (Stock-Dividend)	480,000.00
Total Capital - -	$500,000.00
Capital, Surplus and Undivided Profits -	$1,454,000.00

Let us serve you when you need banking service in Suffolk

A Bank with sixty years uninterrupted service.

SPECIAL ATTENTION
GIVEN SOUTHERN
BUSINESS

FOURTH & FIRST
NATIONAL BANK
NASHVILLE, TENNESSEE

Resources over $33,000,000.00

The Merchants and Farmers Bank

THE MERCHANTS AND FARMERS BANK is engaged strictly in the Business of Banking. That our methods and management inspire confidence is confirmed by the history of the bank.

The same zealous regard and fidelity that has held old friends will be extended to new friends.

The Merchants and Farmers Bank welcomes the opportunity to participate in the development of Spartanburg, and recognizes in it the response to the active publicity campaigns the city has engaged in, in which it has always cheerfully taken part.

Spartanburg cannot do less than embrace its opportunity.

SPARTANBURG ACTS PROMPTLY
AND DECISIVELY

THE MERCHANTS AND FARMERS BANK RESOURCES OVER $1,000,000.00

SPARTANBURG, SOUTH CAROLINA

OFFICERS:

A. L. WHITE, President — W. S. MONTGOMERY, Vice-Pres.
J. L. FLEMING, Cashier — C. M. CREWS, Assistant Cashier
GABRIEL CANNON, Assistant Cashier

Electric Bond *and* Share Company

(Incorporated in 1905)

Extends its congratulations to
The South on its
Substantial Development

We extend the facilities of our organization to those desiring information on companies with which we are identified

Electric Bond *and* Share Company

(Paid-up Capital and Surplus $60,000,000)

71 BROADWAY, NEW YORK

WE are proud to be known as a Southern institution and consider it a privilege to work with those who are devoted to the task of bringing the marvelous resources of the Southland to the attention of the nation and the world.

Send us your Charleston Items

The KANAWHA NATIONAL BANK

"THE BANK OF SERVICE"

CHARLESTON WEST VIRGINIA

LINKED WITH THE SOUTH'S DEVELOPMENT THROUGH FOUR DECADES OF SOUND BANKING SERVICE TO SOUTHERN ENTERPRISE

Birmingham Trust & Savings Co.

20th Street between 1st and 2nd Avenues BIRMINGHAM, ALABAMA

Tuscaloosa

has the coal and iron, timber and fire clay that insure a prosperous industrial future.

This Bank is organized and equipped to supply a quality of service that will stimulate the community's growth.

The MERCHANTS BANK & TRUST CO.

TUSCALOOSA, ALA. CAPITAL AND SURPLUS $300,000.00

THE BALTIMORE LIFE INSURANCE CO.

HEAD OFFICE

BALTIMORE LIFE BUILDING

BALTIMORE - - MARYLAND

Issues All Forms of OLD LINE and INDUSTRIAL INSURANCE POLICIES

The Directors of this company are all practical insurance men, who are fully acquainted with the value of Life Insurance, and they

ADVOCATE LIFE INSURANCE

IN THIS

OR ANY GOOD COMPANY

Southern Banks Leading Factors in Development of the South

THE total bank deposits of the South today are within 11 per cent of the aggregate bank deposits in all banks—national, state, savings, private banks and trust companies—in the United States in 1900.

With about one-third of the country's total population and area, the total bank deposits in all banks in the South in 1923 amounted to $6,515,000,000. The total bank deposits increased in the South from $190,564,000 in 1880 to $6,515,000,000, as stated, or 3318 per cent. The total bank deposits in the South in 1900 had increased to $681,453,000; in 1910 they amounted to $1,955,935,000. Since 1910 the total bank deposits in the South increased by 233 per cent, while the increase in the total bank deposits in the rest of the country, outside of the South, during this period was about 162 per cent.

The financial institutions of the South—national, state, private and savings banks, and trust companies—are factors in its material progress which cannot be overlooked. They enter into every phase of commercial, industrial and agricultural life, and hold a position of responsibility shared by no other business interest. Because of their close relationship with all branches of activity they are of necessity compelled to be intimately identified with every phase of their community's growth. To manufacturers and other investors seeking opportunities in the South the banking interests will be pleased to offer information with respect to the advantages of their respective communities.

The Alabama Bank and Trust Company

MONTGOMERY ALABAMA

Capital	$ 300,000.00
Surplus and Undivided Profits	70,000.00
Deposits	2,400,000.00

OFFICERS

B. P. CRUM	President
W. K. PELZER	Vice-President
M. A. VINCENTELLI	Vice-President
J. D. FLOWERS	Vice-Pres. and Cashier
J. TERRY SMITH	Asst. Cashier
V. B. MURRAY	Asst. Cashier

Member Federal Reserve System

Bank *of* Winter Park

WINTER PARK - FLORIDA

RESOURCES
OVER THREE-QUARTERS OF A MILLION DOLLARS

BUNNELL STATE BANK

FLAGLER COUNTY has some feature that will interest you, and we shall be glad to advise you regarding the opportunities here.

BUNNELL FLAGLER COUNTY FLORIDA

THE FIDELITY BANK

NEW SMYRNA, FLA.

CAPITAL $75,000.00

LET US TELL YOU OF THE OPPORTUNITIES HERE
NO STATE INCOME TAX TO PAY

State Bank *of* Eau-Gallie

EAU-GALLIE
FLORIDA

Eau-Gallie, the Harbor City of the Florida East Coast

FIRST NATIONAL BANK

SANFORD, FLORIDA

Capital and Surplus $220,000.00

FOR FORTY YEARS A LEADING FACTOR IN THE DEVELOPMENT OF THIS SECTION

Central Bank and Trust Company

Capital and Surplus, $115,000.00

LAKELAND FLORIDA

THE LEWIS STATE BANK

TALLAHASSEE, FLORIDA

FLORIDA'S OLDEST BANK

The Hill City of Florida is a Good Place in Which to Live

Melbourne State Bank

MELBOURNE, FLORIDA

Let us tell you about this section of Florida

The EXCHANGE NATIONAL BANK

OF TAMPA, FLORIDA Resources $8,500,000.00

Thirty years of co-operating with the productive interests of the State of Florida

A. C. CLEWIS, Chairman of Board of Directors
J. A. GRIFFIN, Pres. JNO. O. PERRY, Cashier
C. C. WHITAKER, V.-Pres. F. OTTO ANDERSON, Asst. Cashier
P. O. KNIGHT, V.-Pres. T. G. MIXSON, Asst. Cashier

VERO BANK AND TRUST CO.
VERO, FLORIDA
Capital and Surplus, $60,000.00
O. O. Helseth, Pres. D. C. Cox, V.-Pres. Wm. Atkin, Cashier
If you want to know about VERO—Write Us

LET US TELL YOU ABOUT GULFPORT
BANK OF GULFPORT
GULFPORT, MISSISSIPPI
CAPITAL AND SURPLUS, $105,000.00
"THE BANK OF FRIENDLY SERVICE"

WE are in the banking business for profit, but we recognize a greater obligation, that of helping to build up this State. We believe in Georgia. We believe in Athens, Ga. This City and section are worthy of the consideration of anyone desiring a healthful, sane place in which to live and work. *Write us.*
Commercial Bank *of* Athens, Ga.

The Oldest National Bank on the Mississippi Coast
The FIRST NATIONAL BANK
GULFPORT, MISSISSIPPI
Resources Over Three Million Dollars

1833 1924
Georgia Railroad Bank
OWNED BY
GEORGIA RAILROAD AND BANKING CO.
AUGUSTA *"Sudden Service"* GEORGIA

COMMERCIAL NATIONAL BANK & TRUST COMPANY
LAUREL, MISSISSIPPI
Special Attention Paid to Collections

THE BRUNSWICK BANK AND TRUST COMPANY
ESTABLISHED 1889 BRUNSWICK, GA.
Collections *Properly* Handled and *Promptly* Remitted

MERCHANTS and FARMERS NATIONAL BANK CHARLOTTE NORTH CAROLINA
Capital, . . . $200,000.00
Surplus Profits . . $500,000.00
CORRESPONDENCE INVITED

W. C. LANIER, *President* AMOS HUGULEY, *Vice-President*
WILLIS JOHNSON, *Vice-President* H. C. SAPP, JR., *Cashier*
The First National Bank
WEST POINT GEORGIA
CAPITAL AND SURPLUS . . $145,000.00
DEPOSITS $1,100,000.00

The Commercial National Bank
HIGH POINT, NORTH CAROLINA
CAPITAL AND SURPLUS, $1,000,000.00
J. ELWOOD COX, *President*
C. M. HAUSER, *Vice-President* V. A. J. IDOL, *V.-Prest. & Trust Officer*
C. H. MARRINER, *Cashier* E. B. STEED, *Asst. Cashier*
W. T. SAUNDERS, *Asst. Cashier* J. W. HIATT, *Asst. Cashier*

Calcasieu National Bank
OF SOUTHWEST LOUISIANA
MAIN OFFICE, LAKE CHARLES, LA.
Capital and Surplus $1,250,000.00
INVITES YOUR BUSINESS

The Citizens National Bank *and*
The Raleigh Savings Bank & Trust Co.
RALEIGH, NORTH CAROLINA
Have served to promote the growth of North Carolina for more than a half century

MARINE BANK & TRUST COMPANY
NEW ORLEANS

Unexcelled Foreign Connections for forwarding and handling documentary drafts covering Imports and Exports.
LETTERS OF CREDIT ISSUED
All Louisiana and Mississippi items are handled direct. Bill of Lading Collections receive special attention.
Resources — Twenty-Nine Million Dollars

The Commercial National Bank
of RALEIGH, N. C.
TOTAL RESOURCES OVER NINE MILLION DOLLARS
"WE PROTECT YOUR INTEREST"

The Atlantic Savings Bank
CHARLESTON SOUTH CAROLINA
COMBINED RESOURCES OVER $8,000,000.00
The Atlantic National Bank
CHARLESTON SOUTH CAROLINA

Information and Service

OUR thorough knowledge of conditions and surroundings of this section of the South, gained by 30 years of practical experience, enables us to give reliable information, and handle any business connected with banking in a most efficient and dependable manner,

FIRST NATIONAL BANK
WASHINGTON NORTH CAROLINA

A. M. DUMAY, *President* J. D. WEBB, *Cashier*

FIRST NATIONAL BANK
HOUSTON, TEXAS

Capital, Surplus and Undivided Profits, $3,379,861.09
Deposits $34,040,370.53
Resources $40,660,038.00

The National Bank of Commerce
NORFOLK, VIRGINIA
RESOURCES OVER $22,000,000.00
THE LARGEST BANK IN TIDEWATER VIRGINIA

INVESTMENT SECURITIES — 1ST NATIONAL COMPANY — SAINT LOUIS MISSOURI

CALL'S BANKERS SERVICE CORPORATION
ACKNOWLEDGED LEADERS IN ALL BRANCHES OF BANK ADVERTISING
SAVANNAH GEORGIA

The National Exchange Bank
CAPITAL $100,000 SURPLUS $75,000
CHESTER, SOUTH CAROLINA
J. L. GLENN, *President*
S. M. JONES, *Vice-President* N. M. McDILL, *Active Vice-President*
WM. McKINNELL, *Cashier* S. F. MURPHY, *Assistant Cashier*

BALTIMORE COMMERCIAL BANK
GWYNN CROWTHER, *President*
BALTIMORE, MARYLAND
Its policy is pleasing 16,000 customers who are its friends.
Address us in regard to your financial requirements
Capital and Surplus $1,000,000.00 Member Federal Reserve System

Come to Georgia, "*The Empire State*"

Babson says Florida is the greatest Agricultural State, Alabama the greatest industrial State, Georgia the *Greatest State* in the Union because *Georgia combines both.*

Shrewd business men are looking for new fields. The North, the East and certain sections of the West have reached the saturation point, and the South in now the Mecca of the nation. Result: This section is experiencing the most wonderful industrial and agricultural development in the history of the world. The magnificent opportunities are apparent even to the casual mind.

GEORGIA IS GROWING AS IT NEVER GREW BEFORE

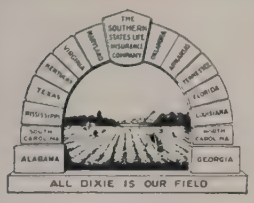
We have a corps of trained experts to render you a free consultation service, Write us frankly as to your needs and let us assist you. All communications treated in strict confidence.

Industrial locations a specialty

The L. W. Rogers Realty & Trust Company

Capital, $350,000.00
29 North Forsyth Street Atlanta, Georgia

INSURANCE CONSTRUCTION LOANS LEASES REAL ESTATE



WILMER L. MOORE, *President*

The
Southern States Life Insurance Company

A SOUTHERN Company operating in the heart of the South: a Company which understands the needs and requirements of the people of the South.

Prompt and complete "Service to Policy-holders" is its watchword. Its semi-annual report shows substantial gain in all departments.

Insurance in Force	$52,189,981.00
Admitted Assets	5,599,392.99
Liabilities	5,278,897.36
Surplus for protection of policy-holders	320,495.36
Total paid policy-holders since organization	4,293,058.84

Open for negotiations with live, active men capable of producing a good volume of paid-for business. For liberal contracts apply to

Read thoughtfully the article in this edition entitled "Southern Life Insurance Companies' Growth."

WILFRED S. McLEOD
Agency Manager ATLANTA, GA.

SAN JACINTO LIFE BUILDING

A SOUTHERN Institution, located at the head of the great Sabine District, devoting its best efforts, energies and resources to the development of the South.

SAN JACINTO
LIFE INSURANCE CO.
BEAUMONT - TEXAS

Southern Union
Life Insurance Co.
of FORT WORTH, TEXAS

AN AGGRESSIVE COMPANY

With an unbroken record of service to its policy-holders—a growing company in which the human element enters into its every business transaction with the public.

INSURANCE IN FORCE
Over Forty Millions
$40,000,000

ASSETS IN EXCESS OF FOUR MILLIONS
$4,000,000

NEW BUSINESS PRODUCED
during first eight months of 1924 over Ten Million Five Hundred Thousand

TERRITORY—in TEXAS open to active men who can qualify

J. L. MISTROT
President

TOM POYNOR
Vice-Pres. & Agency Mgr.

The House that Service Built

NATIONAL LIFE AND ACCIDENT BUILDING, NASHVILLE

ORGANIZED in 1898, but taken over in January, 1902, by its present officers, the same men who are today actively at the head of the company—The National Life & Accident Insurance Company—feels merited pride in its steady and almost unprecedented growth. Starting from a small organization operating in the State of Tennessee, it has developed today into an organization of two thousand five hundred home office and field employes, operating in twenty-one states.

NO small amount of the growth of the company, as ably represented by our magnificent home, is due to the real, satisfactory SERVICE the company has rendered. At its inception the company's officers realized that only through SERVICE could success come. Its growth best illustrates how true this belief was and how faithfully the company has held to its ideals.

AMONG more than two hundred and seventy American Life Insurance Companies last year, The National Life & Accident stood in the list of the greatest fifty on business in force. Ranking among the fifty largest companies is an achievement of which we are justly proud.

Shielding Millions —
Are We Shielding You?

The
National Life & Accident
Insurance
Company

THE NATIONAL LIFE AND ACCIDENT INSURANCE COMPANY SHIELDS YOU

Home Office:
NATIONAL BUILDING
NASHVILLE, TENN.

A. M. BURTON . . . *President and General Manager*

Life & Casualty
Insurance Company
of TENNESSEE
NASHVILLE

INCORPORATED SEPTEMBER, 1903

INSURANCE IN FORCE

On Life Policies, over $85,000,000
On Travel and Pedestrian Accident Policies, over $45,000,000

Claims paid to Policyholders since organization, $12,908,904.61

This Company, in addition to the policy reserves required by law, has set aside for the further protection of its policyholders a Reserve for Contingencies of $300,000. This reserve, added to the Capital Stock and Surplus, gives the policyholders a Surplus of $1,251,371.03

We do not claim to be the oldest or largest life insurance company in the United States but we do challenge any company with Home Office north of the Mason-Dixon Line, our age or older, as to financial strength. We have $1.61 for each dollar of policy liability. This challenge is based on our semi-annual report of June 30, 1924.

North Carolina Mutual Life Insurance Company

JOHN MERRICK, *Founder*
DURHAM, N. C.

Insurance in force, over $40,000,000
Assets, $2,000,000

Over half of which is invested in first liens on improved property owned by negroes in the South

C. C. SPAULDING, *President* — E. R. MERRICK, *Treasurer*
J. M. AVERY, *Secretary*

SESSIONS LOAN & TRUST COMPANY

MARIETTA, GEORGIA

6% FIRST MORTGAGES 7%

Our thirty-five years of successful business guarantees the safety of your funds

FOR RELIABLE INFORMATION CONCERNING GEORGIA FARM AND CITY FIRST MORTGAGES
CALL UPON, WRITE OR WIRE US

Millions For The South

We lend on Office Buildings, Commercial Property, Industrial Property, Religious Institutions, Hospitals and Sanitariums, Hotel and Apartment Buildings, Residences in large cities, Timberlands, Farmlands.

We supply high-grade first-mortgage investments secured by the property listed above.

Best possible terms. Full particulars upon request.

Mortgage and Securities Company

Capital and Surplus over $1,200,000

Canal and Camp Streets
NEW ORLEANS

Security Building
SAINT LOUIS

8% MIAMI 8%

FIRST MORTGAGES
FIRST MORTGAGE BONDS
FIRST MORTGAGE CERTIFICATES

Interest Payments Guaranteed Through Our Unlimited Service Department

DAVENPORT & RICH MORTGAGE COMPANY unqualifiedly guarantees the interest payments on the due date, personal supervision of the property, collection and remittance of the interest, etc., without loss or expense to the investor.

SAFEGUARDED by the best security on earth—First Mortgage Liens on active central business properties in Miami, Florida.

CAPITAL $1,000,000.00

Consult Us
About Your Investments

SAFETY AND SERVICE
DAVENPORT & RICH
MORTGAGE COMPANY

Write for Our New
Descriptive Booklets

Professional Building

MIAMI, FLORIDA

"*Where There Is No Vision the People Perish*"

FLORIDA

The eyes of the world are at present turned toward this State. In Northwestern Florida—where the farm and fruit lands are as good as the best—we still have 80,000 acres. The State chemists report our drinking water 99.9% pure. Our climate is possibly the best all-the-year-round climate in the world—health conditions are unsurpassed. We will sell you some of this wonderful opportunity at our low price and on easy terms. The only section of Florida where you are *assured* of a profit on your investment. *Write for full particulars.*

McCaskill Investment Company (*Owners*)

ROBERT E. LEE McCASKILL, *President*

McCASKILL BLOCK,
DEFUNIAK SPRINGS, FLORIDA *or* PENSACOLA, FLORIDA

Brandon, Gordon & Waddell

MUNICIPAL BONDS

120 BROADWAY
NEW YORK

We specialize in bonds of municipalities in the South. Upon request we shall be pleased to submit offerings of such issues yielding **4½% to 5½%.** We are always prepared to make bids on good Southern municipal bond issues.

R. C. HUNT & COMPANY

8% MIAMI FIRST MORTGAGE SECURITIES SOLD TO NET 8%

Send for Booklet and other interesting Literature regarding our Plan of Safeguarding Investors Tenth Year

MIAMI 41 N. E. First Avenue FLORIDA

ESTABLISHED 1869

SOUTHERN MUNICIPALS AND INDUSTRIALS

High grade general market industrials, rails, public utilities
Prime First Mortgage Real Estate Bonds
New Orleans Listed and Unlisted Securities

MOORE, HYAMS & COMPANY

INCORPORATED

610 Common Street Main 8240-2 New Orleans, La.

R. A. TERRELL

INVESTMENT SECURITIES

503 TITLE GUARANTEE BUILDING
BIRMINGHAM, ALABAMA

Atlantic Bond and Mortgage Guaranty Company
WEST PALM BEACH, FLORIDA

8% GUARANTEED FIRST MORTGAGES IN AMOUNTS TO SUIT

8% GUARANTEED FIRST MORTGAGE BONDS IN AMOUNTS OF $100.00, $500.00, $1,000.00

New Amsterdam Casualty Company

A PROGRESSIVE SURETY AND CASUALTY COMPANY

60 John Street
NEW YORK

227 St. Paul Street
BALTIMORE, MD.

Established 1870 Capital $300,000

The SOUTHERN MORTGAGE COMPANY

10 Auburn Ave., Atlanta, Georgia

WE INVITE ATTENTION TO OUR LOANS ON ATLANTA REAL ESTATE AND GEORGIA FARM LANDS

Atlanta Loans

We can furnish choice loans on high class Dwellings, Apartment Houses and business property. The population of Atlanta at the last census was over 200,000, and is now estimated to be 250,000 and will probably reach 300,000 by 1930. The City is growing rapidly and money is needed to carry on the development.

Atlanta is one of the important cities of the country. It is surrounded by an agricultural territory unsurpassed in soil, climate and natural resources. It is the railroad, manufacturing, business and financial center of the Southeast. It has the largest banking institutions south of Philadelphia and is the home of one of the Federal Reserve Banks. There are no better investments than good loans on Atlanta real estate.

Georgia Farm Loans

The agricultural outlook in Georgia was never more promising. The past three years have been trying ones, but the worst is over and a new era is dawning. Land values have already reached bottom and the trend is now upward. Loans made at this time will be based on steadily increasing values. The shiftless element, white and black, has been eliminated. The dross has been swept away, and the men and women now on the farms are the pure gold of the agricultural population. They withstood the shock of deflation and weathered the storm of falling prices. They are on the farms to stay.

We are in position to furnish loans of the choicest character at good rates on Georgia farms

The SOUTHERN MORTGAGE COMPANY

J. T. Holleman, *President* J. W. Andrews, *Secretary*
W. L. Kemp, *Vice-President* Horace Holleman, *Treasurer*

"Use Your Brains"

OUR President, Willis W. Hall, recently made this statement: "After 20 years' experience in Miami, I consider investments here safer than ever. On account of the increasing business activity in this section, we can use an almost unlimited amount of money, and under our plan the losses are negligible."

Send for our booklet on Miami Investments. We pay 8% on Savings, compounded Quarterly. We make 16% and divide the profits. Your account is solicited.

Reference: "Any Bank in Miami."

PEOPLES LOAN & SAVINGS CO.

F. A. STAKEMILLER, *Secretary*

MIAMI, FLORIDA

8% and Safety

DIVIDENDS payable January 1st and July 1st, computed from date of investment. Your money can be withdrawn any time. We operate under State supervision.

Write for Booklet No. 4 explaining our plan of operation.

Orange County Building and Loan Association

ORLANDO, FLORIDA

"The City Beautiful"

FLORIDA FIRST MORTGAGES

—ON—

HOMES and INCOME PROPERTY

8%

INTEREST

PAYABLE SEMI-ANNUALLY

for Information write

FIRST BOND AND MORTGAGE COMPANY

Capital Paid in $550,000

ORLANDO, FLORIDA

FIRST NATIONAL BANK BUILDING

FLORIDA LAND

THERE is no better investment in the world than Florida land. Your titles can be safeguarded by having this Company furnish you with Abstracts and Title Insurance.

We have on hand, at all times, first mortgages netting the investor 8 per cent interest payable semi-annually. These mortgages are made upon improved property and are protected in full by fire insurance and Title Guarantee Policies.

Bring your title troubles to us.

FIDELITY TITLE AND LOAN COMPANY ORLANDO, FLORIDA

Capital and Surplus, $300,000.00
Established 1883

WM. BEARDALL
Sec'y and Treasurer

SOUTHERN MILL STOCKS

Bank Stocks, State, Municipal, County Bonds, North Carolina Railroad Stock and other High-Grade Securities

Twenty-seven years' experience in Southern Mill Stocks, and a carefully developed mailing list extending from Portland, Me., to New Orleans, at your service when dealing with

F. C. Abbott & Co.
Johnston Building, 212-14 South Tryon Street
CHARLOTTE, NORTH CAROLINA

A. M. LAW & COMPANY
INCORPORATED

INVESTMENT SECURITIES, SOUTHERN COTTON MILL STOCKS, MILL PROPERTIES, MUNICIPAL BONDS

ESTABLISHED 1892
SPARTANBURG, S. C.

Hunting Preserve

WE are offering for sale a preserve containing thirteen hundred acres of land situated on the coastal highway thirty-five miles North of Charleston, S. C. This tract borders on Cooper River, and includes two hundred acres of rice fields in perfect condition for duck shooting. Deer, turkeys, quail and other game in abundance. Trout fishing excellent all the year round. Ten room colonial mansion, with small repair will make a splendid club house. For further particulars, *write*

REAL ESTATE & TRUST CO.
FLORENCE, S. C.

BONDS

BID, PERFORMANCE
FIDELITY *and* SURETY

LIABILITY, AUTOMOBILE AND FIRE
INSURANCE
ON CONTRACTS AND EQUIPMENT

ALSO HANDLING
MUNICIPAL BONDS AND WARRANTS
for Contractors
Municipalities
and Owners

HARRY F. FROMME & CO.
FOURTH FLOOR, GRAHAM BUILDING
JACKSONVILLE, FLORIDA

TO KNOW THE SOUTH
Read
MANUFACTURERS RECORD
Published Weekly — *$6.50 per year*
Blue Book of Southern Progress
Published Annually — *50 cents per copy*
Manufacturers Record Publishing Co.
Baltimore, Md.

HODENPYL, HARDY & COMPANY., INC., has been identified for a long time with the Electric Light and Power Industry. The outlook for this Industry is clearly defined and many attractive investment opportunities are available. Below is a brief analysis of one of the large systems.

The Tennessee Electric Power Company

The Tennessee Electric Power Company operates one of the most extensive and important public utility systems in the South. Over 65% of its gross earnings is derived from the sale of electricity and during the past five years the hydro-electric stations have supplied 95% of the total electrical output of the System.

The territory served includes practically the entire central and eastern portions of the State of Tennessee, extending nearly 200 miles from east to west and 100 miles from north to south, with an estimated population of over 450,000. This is a section of diversified industries and rich in natural resources. It includes the cities of Nashville, Chattanooga and Knoxville.

623 Miles
Transmission Lines

239,000
H.P. Installed Generating Capacity

64,332
Customers for Electricity

463,168,205
K.W.H. of Electricity Generated

$9,374,304
Gross Earnings Year Ended October 31, 1924

SECURITIES OUTSTANDING

BONDS	Outstanding With Public	Due	Rate	Yield‡
THE TENNESSEE ELECTRIC POWER COMPANY				
First & Refunding Mortgage Gold Bonds	$22,135,400	1947	6%	6.10%
Ten-Year Debenture Bonds	950,000	1933	6½%	6.60
Fifteen-Year Debenture Bonds	1,000,000	1939	6½%	6.60
DIVISIONAL BONDS				
TENNESSEE POWER COMPANY				
First Mortgage Gold Bonds	2,256,000	1962	5%	5.48
CHATTANOOGA RAILWAYS COMPANY				
First Consolidated Mortgage Gold Bonds	1,820,500	1956	5%	6.22
CHATTANOOGA RAILWAY & LIGHT COMPANY				
First & Refunding Mortgage Gold Bonds	627,000	1956	5%	6.25
McGAVOCK & MT. VERNON RAILROAD COMPANY				
First Mortgage Gold Bonds	65,000	1926	6%	3.90
Bonds	485,000	1937	6%	5.77
NASHVILLE STREET RAILWAY COMPANY				
First Mortgage Gold Bonds	907,000	1925	5%	5.00
NASHVILLE RAILWAY & LIGHT COMPANY				
First Consolidated Mortgage Gold Bonds	3,641,000	1953	5%	5.52
Refunding & Extension Mortgage Gold Bonds	2,707,000	1958	5%	5.88
Total Bonds	$36,593,900			
FIRST PREFERRED STOCKS				
The Tennessee Electric Power Co	$ 8,341,800		7%	Over 7%
*The Tennessee Electric Power Co	3,760,000		6%	Over 7%
**The Tennessee Electric Power Co	1,008,200		7.20%	Over 7%
Total First Preferred Stocks	$13,110,000			
SECOND PREFERRED STOCK				
The Tennessee Electric Power Co	50,000 shares		6%	8.45
COMMON STOCK				
The Tennessee Electric Power Co	156,000 shares			

*Including $374,500 par amount, reserved for exchange in the future for a like amount of Nashville Railway and Light Company 5% Preferred Stock outstanding with the Public.

**Includes stock for which subscriptions have been received on a partial payment plan, but not stock sold locally since September 30, 1924.

‡Approximate yield at offering price as of November 24, 1924.

Bond Department

Hodenpyl, Hardy & Co., Inc.

Chicago — 14 Wall Street - New York City — New York

The information contained herein has been obtained from sources which we consider reliable. While not guaranteed, it is accepted by us as accurate

GOAT ROCK DAM. CAPACITY 40,000 HORSEPOWER
(One of three hydro-electric plants)

POWER

for

INDUSTRIAL PURPOSES

BARTLETTS FERRY DAM

Now under construction at COLUMBUS, GEORGIA. Ultimate capacity 80,000 horsepower, of which 40,000 horsepower will be available by January 1st, 1926.

COLUMBUS, GEORGIA, is the second largest textile center of the South, and the natural home of the cotton mill.

A splendid climate, rail and water transportation, experienced native American labor, ample raw materials, equitable laws that encourage industries, low tax rates and reliable power service contribute to the economic conduct of manufacturing industry.

Investigation and Correspondence Invited

COLUMBUS ELECTRIC & POWER CO.

R. M. HARDING, *Manager* G. K. HUTCHINS, *Sales Manager*

COLUMBUS GEORGIA

Under Executive Management

STONE & WEBSTER, Inc.

BOSTON NEW YORK CHICAGO

120,000 horsepower hydroelectric and steam plants of The Tennessee Electric Power Company at Hales Bar on the Tennessee River—one of the largest power developments in the South.

There's Plenty of Hydroelectric Power Available In Tennessee

Power to turn the wheels of industry is available in ample quantities in Tennessee. Manufacturers locating in this section are not confronted with the problem of investing thousands of dollars in power plant equipment. Hydroelectric power is readily obtainable, thereby releasing capital for the installation of facilities for increased production.

The story of the development of hydroelectric power in Tennessee is the story of the rapid industrial growth of Tennessee itself in recent years. Commencing in 1912 with a capacity of 25,000 horsepower, the system of The Tennessee Electric Power Company has steadily grown, until today it ranks as the third largest power system in the South.

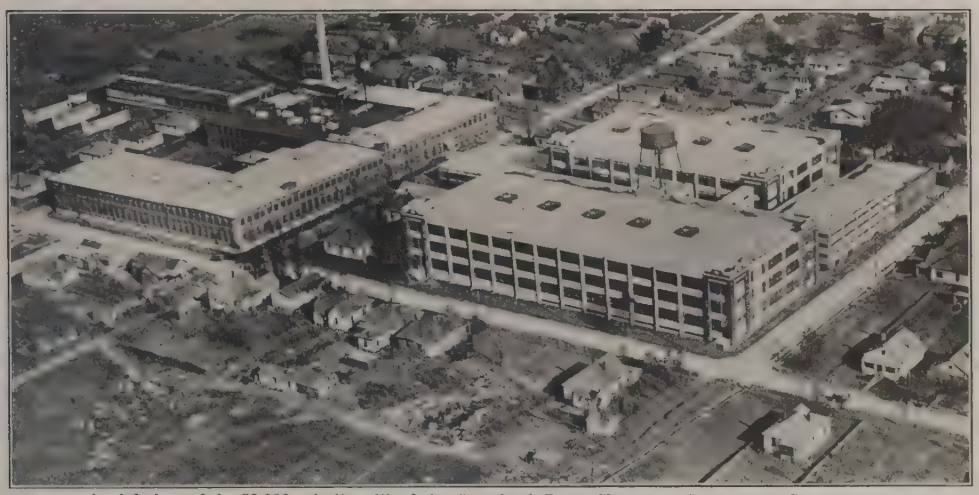
Production has doubled and trebled in this period. 82,000 additional horsepower has been developed in 1923 alone. Energy is now distributed over 1200 miles of transmission lines to 80 cities, towns and communities in Middle and Eastern Tennessee.

Electric power in Tennessee has proved its advantages in every line of industry. Over 1400 manufacturing establishments are using power from this transmission system. These industries have found it cheaper to purchase power than to make it. And the service is adequate, dependable and thoroughly reliable.

With 275,000 horsepower installed in hydroelectric and steam reserve plants and its interconnections with the Southeastern superpower system, The Tennessee Electric Power Company guarantees ample and continuous power service to new industries locating in this section.

The Tennessee Electric Power Co.

CHATTANOOGA, TENNESSEE



Aerial view of the 58,000 spindle mill of the Standard-Coosa-Thatcher Company at Chattanooga —typical of the many modern industrial plants to be found in Middle and Eastern Tennessee.

An Abundance of Raw Materials Offers Splendid Opportunities to Industry

The South today is the real land of opportunity. Northern and Eastern capitalists who visit this section admit it. The South is endowed, as no other part of the country, with a vast wealth of undeveloped mineral, timber and water power resources.

Tennessee—in the very heart of this new industrial empire—possesses a diversity of raw materials in an astonishing degree. Her natural resources offer splendid opportunities for successful business expansion. Millions of dollars are being realized each year from mining operations alone!

Coal, iron ore, copper, zinc, limestone, marble, slate, clays, cement shales and phosphate rock are the bases of many industrial activities in Tennessee today. The large deposits of bauxite, talc, felspar, barytes, silica and manganese are being worked in quantities. Acres of timber land furnish materials for the furniture and woodworking industries. Cotton growing is increasing year by year.

Tennessee in a few short years has progressed to the point where this state now leads other sections of the South—and in some instances the entire country—in output of hosiery, mercerized yarns, woolens, boilers, refrigerators, oil well and saw mill machinery, plows, shovels, malleable iron castings, mortar colors and paper.

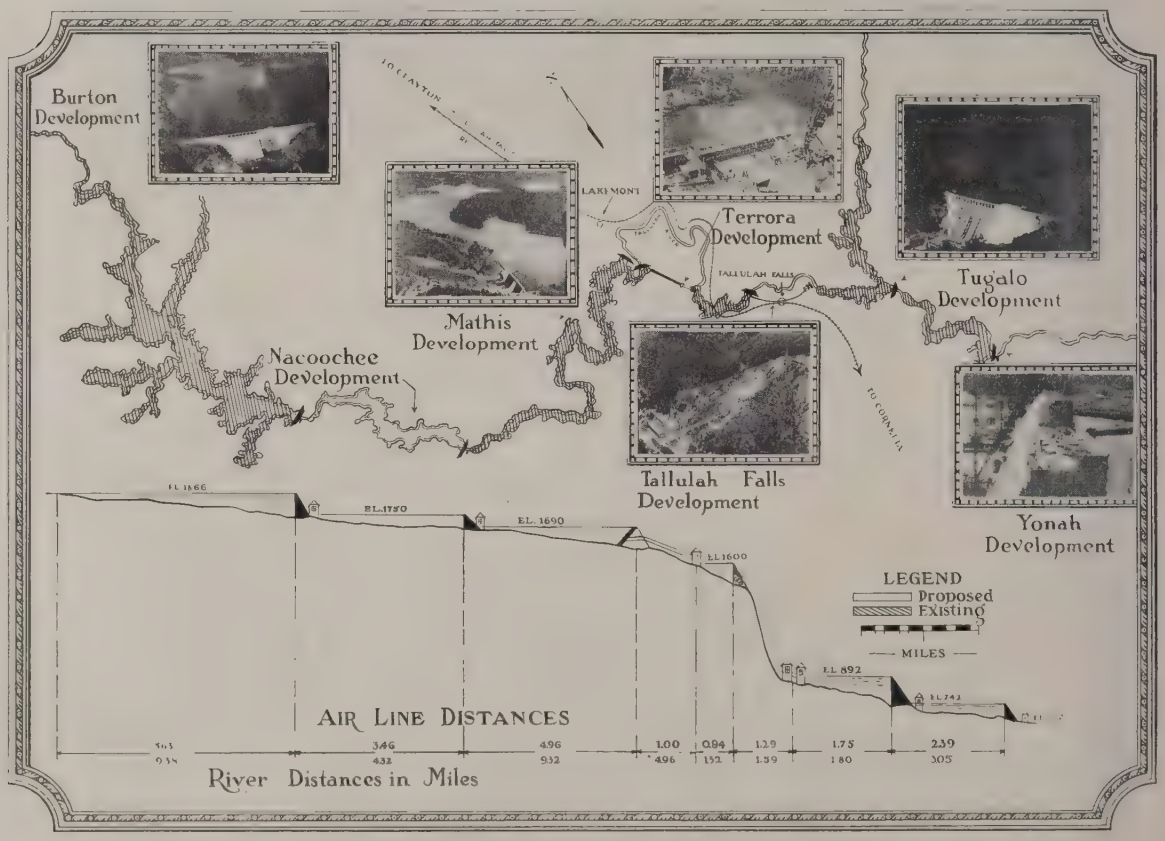
Yet the surface has scarcely been scratched! A recent survey of Middle and Eastern Tennessee by The Tennessee Electric Power Company discloses opportunities in scores of communities where textile, woodworking and metal trade industries can successfully expand their operations. The data of this survey covering raw materials, labor, construction costs, taxes, plant sites, etc., is available to interested manufacturers upon request. Address our Commercial Department or Secretaries of local Chambers of Commerce.

The Tennessee Electric Power Co.

CHATTANOOGA, TENNESSEE

Georgia's Greatest Industrial

Increased production of hydro-electric power and extension of transmission lines has opened up new territory in the most productive area of the state, where equable all-year-round climate, splendid railroad facilities, abundant white labor are available for all industries.



TALLULAH AND TUGALO RIVER DEVELOPMENTS, GEORGIA RAILWAY AND POWER CO.

The lakes and streams comprising the company's developments in North Georgia make that section the playground of the south. Visitors are welcome.

Georgia Railway

Atlanta - -

Development Is Just Ahead---

During 1924 the power production of the Georgia Railway & Power Company reached approximately 400,000,000 kilowatt hours; 125 miles of new transmission lines were constructed, making a total of 923.25 miles of high-tension transmission and distributing lines. Sixty-five cities and towns were served with light and power.

List of Municipalities Now Being Served

Municipalities in which the Company furnishes electrical energy wholesale to the Municipality or some other agency for distribution to the local light and power consumers:

City	Population*	City	Population*
Acworth	1,043	Hoschton	377
Bowman	730	Kennesaw	530
Braselton	148	Lawrenceville	2,039
Buford	2,500	Mansfield	589
Calhoun	1,653	Marietta	6,190
Cartersville	4,350	Milstead	1,000
Cedartown	4,053	Monroe	3,211
Chamblee	710	Newborn	550
College Park	3,622	Norcross	968
Commerce	2,459	Palmetto	922
Covington	3,203	Porterdale	2,880
Dalton	5,222	Rockmart	1,034
East Point	5,241	Rome	13,252
Elberton	6,475	Social Circle	1,590
Fairburn	1,395	Taylorsville	300
Fair Oaks		Toccoa	3,567
Hapeville	3,500	Winder	3,335

Municipalities in which the consumers are served direct by the Company.

City	Population*	City	Population*
Adairsville	1,000	Flowery Branch	461
Alto		Gainesville	6,272
Atlanta	200,616	Hartwell	2,007
Baldwin	512	Ingleside	100
Bellton	149	Hollingsworth	
Bolton	160	Kirkwood	2,934
Bowersville	390	Lavonia	1,756
Canon	1,260	Lithonia	1,428
Carrollton	4,363	Lula	367
Clarkston	501	Mt. Airy	348
Clarksville	1,274	Royston	1,422
Conyers	1,919	Smyrna	599
Cornelia	1,274	Stone Mountain	1,062
Decatur	6,150	Summerville	1,050
Dowey Rose	250	Whitesburg	366
Duluth	625		

*Figures based on 1920 Census

Interconnecting Power Systems

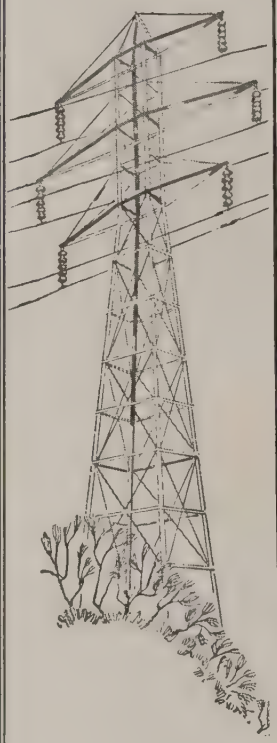
Continuous and dependable service is assured by the connection of the Georgia Railway & Power company's transmission lines with the Central Georgia Power company at Atlanta; Tennessee Electric Power company at Georgia-Tennessee state line; Southern Power company at Tallulah Falls; Columbus Power company at Newnan and the Alabama Power company at Georgia-Alabama state line.

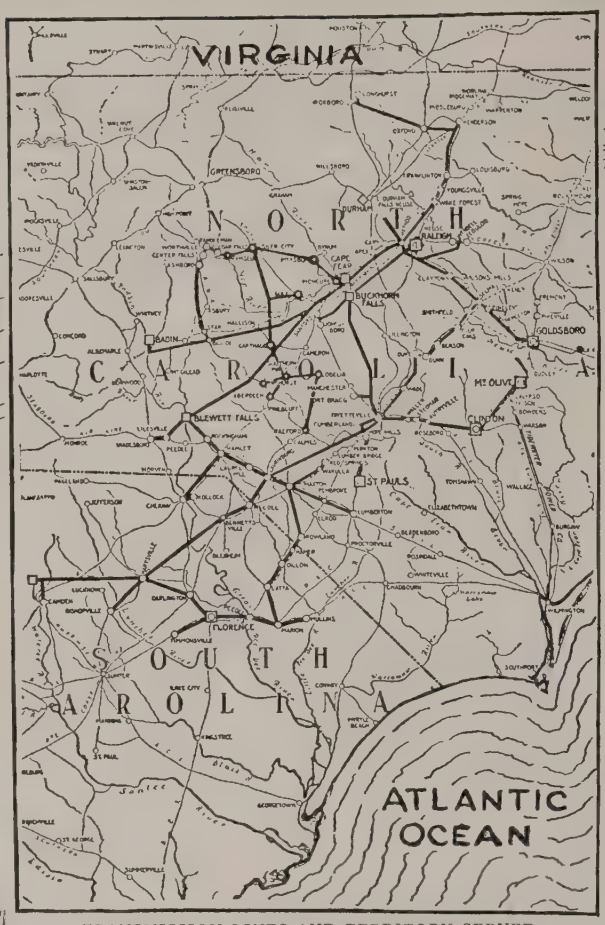
Information regarding any of the cities and towns in our territory will be furnished gladly on application.

and Power Company

- - Georgia

Locate your plant or factory under our lines—Hydro-Electric Power at low rates.





TRANSMISSION LINES AND TERRITORY SERVED

Carolina Power & Light Company and Yadkin River Power Company offers to assist you, and, without obligation, will send an expert to place facts and figures before you.

A New Industrial Empire

DOWN in the healthful region of the central Carolinas a new industrial empire is in the making. There is available an ample supply of hydro-electric power at reasonable rates, and an abundance of efficient native white labor. The mild Carolina climate affords working conditions which are unsurpassed. Large trunk line railway systems furnish adequate railway transportation.

The territory shown above embraces country ranging in character from Piedmont hills to coastal plains—ideal in location for textile industries.

Throughout this territory are now located a large number of prosperous textile industries utilizing hydro-electric power. For full particulars concerning the opportunities and facilities offered for textile and allied manufacturing write—

Carolina Power & Light Company
Yadkin River Power Company

GENERAL OFFICES ~ RALEIGH, NORTH CAROLINA

Manufacturing Profits are LARGER in

ARKANSAS
AND
MISSISSIPPI

Because Costs are LOWER

2,250,000-BALE COTTON CROP
IN THESE TWO STATES THIS YEAR

MATERIALS
Cotton, Timber, Clays and Other Material in Immense Quantity.

LABOR
Ample supply of good, white American labor, capable and willing.

POWER
Abundant Electric Power from hydro and steam plants using natural gas, oil and pulverized coal.

MARKETS
Only a few hours from the great centers of the U. S. and tidewater to the world.

CAPITAL
Business interests willing to invest in manufacturing enterprises.

MISSISSIPPI EXEMPTS NEW INDUSTRIES FROM TAXATION FOR FIVE YEARS. ARKANSAS ASSESSMENTS ARE LOW.

For more Information about Profitable Manufacturing Opportunities in Arkansas and Mississippi, address

Arkansas Light and Power Company
PINE BLUFF, ARKANSAS

Mississippi Power and Light Company
JACKSON MISSISSIPPI

Southern Utility Properties

Under the Supervision of the

BYLLESBY ENGINEERING AND MANAGEMENT CORPORATION

Oklahoma Gas and Electric Company

The largest utility of its kind in the State, serving upwards of 80 cities and towns, including Oklahoma City and Muskogee, with a combined population estimated at 370,000. Power plants aggregate 87,000 horsepower capacity, connected with 925 miles of high tension transmission lines. Two modern steam turbine power stations, with a combined capacity of 50,000 horsepower, have recently been completed and placed in operation. More than 4,000 Oklahoma citizens have invested in the company.

Louisville Gas and Electric Company of Kentucky

This Company and affiliated companies supply the electric light and power and gas requirements of the City of Louisville and environment. Power is generated with coal in a modern 97,000 horsepower steam turbine station, to which a 30,000 horsepower unit is shortly to be added. The Company owns its own coal mine. Gas supply comes from West Virginia, and the Company's own natural gas fields in Kentucky, supplemented by a 16,000,000 cubic feet capacity gas manufacturing plant built at Louisville in 1923. A preliminary permit has been awarded a subsidiary of the Company for the development of a large amount of hydro-electric power which will be available upon the construction of a dam by the Federal Government to improve the navigation of the Ohio river. The Company has in excess of 7,000 home shareholders.

Mobile Electric Company

Supplies electrical requirements of Mobile, Ala., and vicinity, from two modern power stations, one operated under lease; total generating capacity 17,280 horsepower; number of customers served 11,197. Mobile's importance as a shipping, shipbuilding and repairing center is steadily increasing.

BALTIMORE GREW GREAT in the past because of its LOCATION

BALTIMORE WILL GROW GREATER in the future because of its LOCATION

LOCATION is the strategic point in industrial growth, an advantageous location in reference to raw materials, market and power.

Baltimore grew great in the past because of the market advantages its location offered to distributors.

Baltimore, situated at the head of an inland sea, the Chesapeake Bay, has in its location the advantage of a short haul to the Lakes and to the West. Baltimore as a seaport ranks third in the United States;—New York first, Los Angeles second, Baltimore third.

Baltimore's present greatness is due to a phenomenal industrial development, the result of an abundance of reliable electric power at low cost due to its close proximity to one of the largest hydro-electric plants in the East and to the coal regions of the Appalachian range.

The geographical advantages which have given Baltimore prestige in the past are of even greater potency now than at any time in the history of the City, particularly in connection with the unlimited supply of electric power, generated and transmitted under advantageous conditions and sold at low rates.

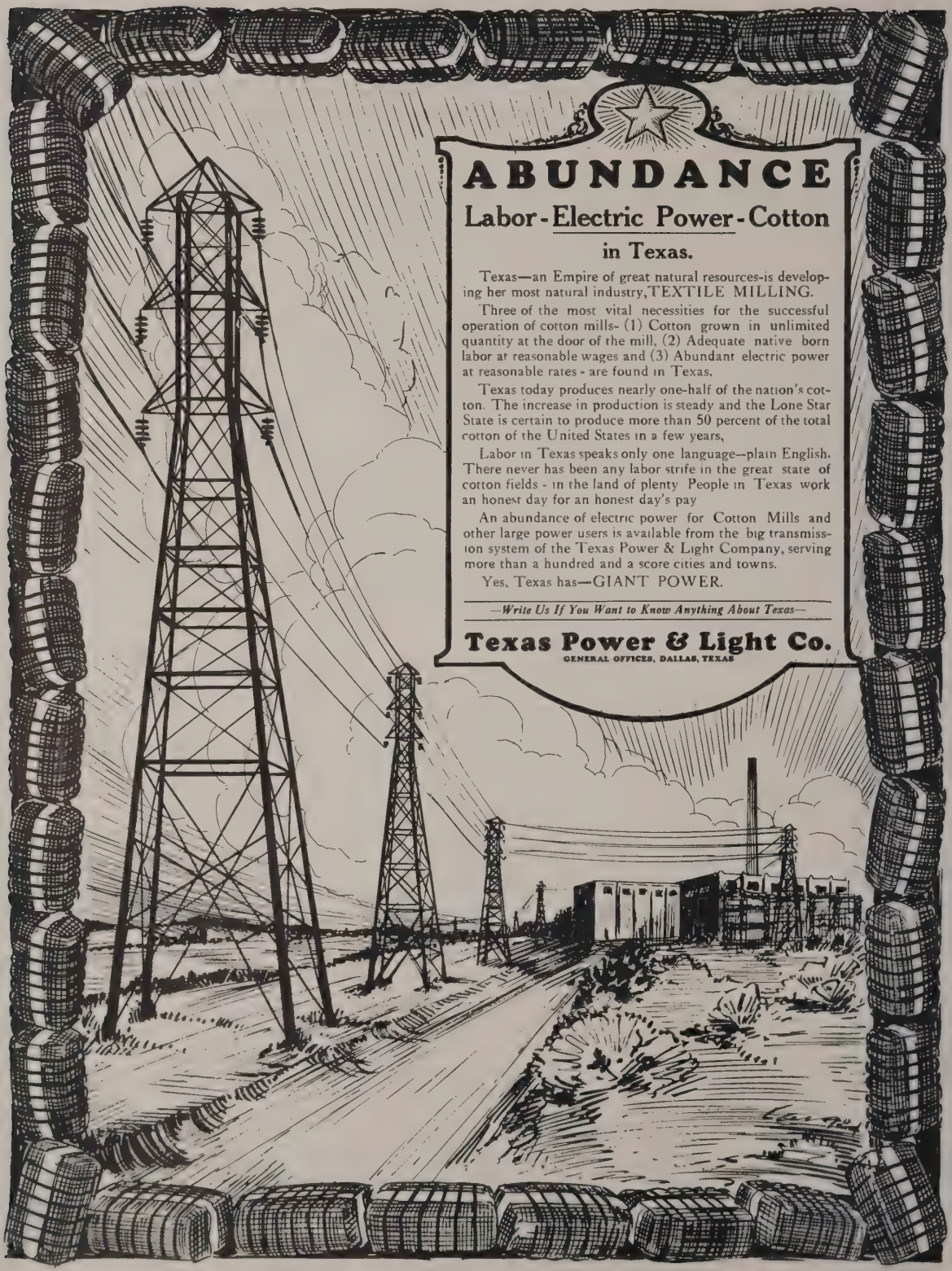
This unrivalled situation as a whole gives Baltimore manufacturers a decided edge on their competitors.

190 new industries have come to Baltimore within the last three years.

A complete industrial survey of Baltimore has been made. The relative cost of manufacture of numbers of lines compared with the cost in any other location can be given in detail by the Industrial Bureau of the Baltimore Association of Commerce.

Statistics show that Baltimore is more thoroughly electrified, particularly as to its industries, through Central Station service than any city in America.

CONSOLIDATED GAS ELECTRIC LIGHT & POWER CO. OF BALTIMORE


ABUNDANCE
Labor - Electric Power - Cotton
in Texas.
Texas—an Empire of great natural resources-is developing her most natural industry, TEXTILE MILLING.
Three of the most vital necessities for the successful operation of cotton mills- (1) Cotton grown in unlimited quantity at the door of the mill, (2) Adequate native born labor at reasonable wages and (3) Abundant electric power at reasonable rates - are found in Texas.
Texas today produces nearly one-half of the nation's cotton. The increase in production is steady and the Lone Star State is certain to produce more than 50 percent of the total cotton of the United States in a few years.
Labor in Texas speaks only one language—plain English. There never has been any labor strife in the great state of cotton fields - in the land of plenty. People in Texas work an honest day for an honest day's pay
An abundance of electric power for Cotton Mills and other large power users is available from the big transmission system of the Texas Power & Light Company, serving more than a hundred and a score cities and towns.
Yes, Texas has—GIANT POWER.
—Write Us If You Want to Know Anything About Texas—
Texas Power & Light Co.
GENERAL OFFICES, DALLAS, TEXAS

Keeping Stride With Progressive West Virginia

Serving the Great Kanawha Valley

THE VIRGINIAN POWER COMPANY has a record of development that reflects the marvelous growth and expansion of industrial West Virginia and the South. Our transmission lines serve the Kanawha, New River, Winding Gulf, Coal River and Gauley Coal Districts of this State and extend from the Eastern to the Western boundaries—and then on to Portsmouth, Ohio.

The Virginian Power Company

MAIN OFFICES:
CHARLESTON, W VA.

STEAM PLANT:
CABIN CREEK, W. VA.

SUBSIDIARIES:

KANAWHA VALLEY POWER CO.
NITRO AND SO. CHARLESTON, W. VA.

PORTSMOUTH PUBLIC SERVICE CO.
PORTSMOUTH, OHIO

The San Antonio and Aransas Pass Railway

THE lines of the SAN ANTONIO AND ARANSAS PASS RAILWAY from Waco and Lockhart on the North, to Corpus Christi, Rockport and Falfurrias on the South, from Houston on the East to San Antonio and Kerrville on the West, traverse the best agricultural territory of the STATE OF TEXAS.

Climate: The country traversed by these lines varies in elevation from tide level at the Sea Coast to 700 feet at San Antonio and 2500 feet at Kerrville.

Temperature is never extremely hot in Summer nor cold in Winter.

Rainfall is abundant and sufficient for the production of all crops without irrigation.

Principal Agricultural Productions are cotton, corn, grain, early vegetables, melons, grapes, citrus fruits, live stock, wool and mohair, poultry and eggs.
Kaolin, and brick and tile clays abound.

Excellent and abundant *Water* may be obtained everywhere.

Large quantities of *Petroleum* and *Natural Gas* are produced, and this production is constantly increasing. Unlimited deposits of *Lignite* exist and are being mined. The oil, gas and lignite assure an abundance of *Cheap Fuel* for domestic and *Manufacturing* purposes.

Transportation: This Railway connects with all the principal trunk lines entering Texas, and has access to the ports of Galveston, Houston and Port Aransas, and to the new port of Corpus Christi, for which about $5,000,000 has been appropriated by the United States and local Governments, and for the construction of which contracts have been let.

All of the above furnish unequalled opportunities for the establishment of manufacturing industries, including

COTTON and WOOLEN MILLS, TANNERIES, SHOE and CLOTHING FACTORIES, PACKING HOUSES; PLANTS FOR CANNING FRUITS, VEGETABLES and SEA FOODS; BRICK and TILE FACTORIES, Etc.

This Company will gladly co-operate in every way with manufacturers establishing such industries.

Our Coast Resorts—Corpus Christi, Portland, Ingleside, Aransas Pass, Port Aransas and Rockport, are patronized throughout the year. Finest wildfowl shooting in season, and fishing and yachting the year round.

HOTELS for all classes of tourists and pleasure seekers are needed.

ADDRESS INQUIRIES TO:

GEO. F. LUPTON, *General Passenger Agent*

J. C. MANGHAM, General Freight Agent, H. M. MADISON, Farm and Immigration Agent,

J. S. PETER, 1st Vice-President and General Manager

GENERAL OFFICES: SAN ANTONIO, TEXAS

AN EPOCH IN TRANSPORTATION MARKED BY EXPANSION OF SEABOARD SERVICE

Seaboard Air Line Railway

Inaugurates *First Through Train Service* to the East Coast of Florida Over *Own Rails* (South of Richmond) *Without Interchange* via *New Cross-Florida Short Line*

Opening in January its new short route from Eastern and Western points to West Palm Beach, establishing double daily passenger service between New York, Washington, Jacksonville and Center Hill, Polk City, Auburndale, Winter Haven (Florence Villa), West Lake Wales (Lake Wales, Mountain Lake Park, Highland Park, Babson Park), Avon Park, Sebring, Okeechobee and West Palm Beach through the picturesque region of Central Florida; and Cross-Florida day and night service between St. Petersburg, Belleair, Clearwater, Tampa, Sarasota, Bradenton and West Palm Beach, through Bartow, West Lake Wales and Sebring, shortening the time by many hours, Coast to Coast.

Also three new fast Limited Pullman trains between New York and Florida, and a new fast limited train between New Orleans and Jacksonville, shortening the time between California, Texas and Florida.

Morning, afternoon and evening departures from New York and Washington

ORANGE BLOSSOM SPECIAL
All Pullman, de luxe.
Boston, Detroit, Cleveland, New York, Washington—Florida's East and West Coasts.

SEABOARD FLORIDA LIMITED
All Pullman, de luxe.
New York and Washington—Florida's East and West Coasts.

THE FLORIDIAN
Coaches—Sleepers—Observation Cars.
Quebec, Montreal, New York, Washington—extreme West Coast of Florida.

ALL FLORIDA SPECIAL
All Pullman, de luxe.
Boston, Detroit, Cleveland, New York, Washington—Florida's East and West Coasts.

CAROLINA—FLORIDA SPECIAL
Coaches and Sleeping Cars.
New York, Washington—Southern Pines, Pinehurst, Camden and Florida.

ATLANTA-BIRMINGHAM SPECIAL
Coaches and Sleeping Cars.
New York, Washington—Carolinas, Atlanta the Southwest.

SEABOARD FAST MAIL
Coaches and Sleeping Cars.
New York, Washington—Carolinas, Atlanta, the Southwest.

SUWANEE RIVER SPECIAL
Coaches and Sleeping Cars.
Chicago, Detroit, Cleveland, Cincinnati, direct to Tampa, St. Petersburg, Sarasota.

CROSS-FLORIDA LIMITED (DAY SERVICE)
Coaches and Parlor Cars.
St. Petersburg, Belleair, Clearwater, Tampa—points in Central Florida and West Palm Beach.

COAST to COAST LIMITED (NIGHT SERVICE)
Coaches and Sleeping Cars.
St. Petersburg, Belleair, Clearwater, Tampa—points in Central Florida and West Palm Beach.

NEW ORLEANS—FLORIDA LIMITED
Coaches and Sleeping Cars.
New Orleans—Jacksonville.

Seaboard trains equipped with latest steel coaches and Pullman sleeping and parlor cars. Observation cars on all through day trains in Florida. Seaboard Dining Car Service—"unexcelled"—on all through trains.

The only line selling DIVERSE ROUTE TICKETS to Florida including both East and West Coast Resorts, with STOP-OVER privilege at the famous Carolina Resorts—Southern Pines, Pinehurst, Camden.

C. H. GATTIS
Assistant Gen'l. Passenger Agent
Norfolk, Va.

W. L. McMORRIS
General Passenger Agent
Norfolk, Va.

C. B. RYAN
Passenger Traffic Manager
Norfolk, Va.

SOUTHERN INDUSTRIAL PROGRESS HAS JUST BEGUN

OPPORTUNITY AWAITS THE MANUFACTURER OF TEXTILES—COTTON, WOOL, SILK, PULP AND PAPER, (Kraft, Bond, Book) CERAMICS—BRICK, TILE, PIPE. WOODWORKING, AGRICULTURAL SUPPLIES. ELECTRO-CHEMICALS, CANNING AND PRESERVING.

SUCCESS IS POSSIBLE BECAUSE OF A COMBINATION OF THE FOLLOWING FUNDAMENTALS

LABOR

Native born, white, Anglo-Saxon, highly intelligent, loyal to employer.

POWER

Hydro-electrical power from the South's super-power zones. Abundant steam coal from West Virginia, Kentucky, Tennessee and Alabama fields. Fuel oil at all seaports.

CLIMATE

Conducive to high production and pleasant living conditions. A death rate lower than that of many northern and western states.

MATERIALS

Wide variety of metallic and non-metallic minerals. Fibres, woods and agricultural products suitable for use in all the above named industries.

MARKETS

Short rail haul to northern and western markets, plus the added advantage of outlets through South Atlantic and Gulf ports for world-wide distribution.

THE PURCHASING POWER OF THE SOUTH IS INCREASING AMAZINGLY

Full information concerning industrial opportunities.

Address: DIRECTOR OF DEVELOPMENT

Seaboard Air Line Railway

SAVANNAH, GA.

THE SOUTH IS A LAND OF OPTIMISM

The Seaboard Air Line Railway serves the richest and most productive sections of Virginia, North and South Carolina, Georgia, Alabama and Florida. No other parts of the United States show a larger measure of prosperity in agriculture or better opportunities for practical farmers of all classes.

The South's Paramount Need

IN the production of all staple crops Southern farmers are making satisfactory progress, but in dairying, cattle, sheep, hog and poultry raising, the South is lagging behind the demands of its home markets. Millions of dollars annually are expended for meats and dairy products exported from distant states, all of which can be produced profitably at home. The importation of dairy products from the middle West are estimated to cost $200,000,000 annually. Georgia spends $30,000,000 a year for imported meats. South Carolina last year bought $7,000,000 worth of imported butter. These figures emphasize the need for practical dairymen, stock and poultry raisers.

Farm lands at $50 per acre in the South will produce greater tonnage in forage and ensilage than $150 per acre lands in the middle west. The seasons are longer and milder, furnishing green food for nine to twelve months, and the home market is unlimited.

If you desire the free advice of our agricultural experts write to

DIRECTOR OF DEVELOPMENT

Seaboard Air Line Railway

202 OGLETHORPE BUILDING SAVANNAH, GA.

A REPRESENTATIVE CAROLINA COTTON MILL

TRAVERSING THE CREAM OF THE MANUFACTURING DISTRICT OF NORTH AND SOUTH CAROLINA

The Piedmont & Northern Railway

"A MILL TO THE MILE"

AND

Durham & Southern Railway

Offers to textile manufacturers who are considering the removal of their mills a very attractive proposition which we will lay out and discuss with any interested persons.

May we discuss it with you personally?

J. S. CURETON, Traffic Manager
GREENVILLE SOUTH CAROLINA

PIEDMONT AND NORTHERN R.Y.

Serves 135 Cotton Mills Owns 148 Warehouses
Modern, well-equipped, well-paved Freight Terminals
Fast Through Freight Service Through Package Car Service

The Railroads—Promoters of Prosperity

How many of us, when thinking of a railroad, obtain a clear conception of its vital necessity as a first aid to industry? Do not all of us all too frequently accept it as a matter of fact—a mere carrier of persons and property? The truth is that there is no single factor of greater importance in the maintenance and success of our business structure than an efficient railway system

HAVING encouraged the work of developing the East Coast of Florida, and being most interested in its continued progress, and, as well, in the comfort, convenience and prosperity of its patrons, the Florida East Coast Railway, Flagler System, is now in the midst of the greatest construction program that has been contemplated by it since Mr. Flagler carried out his remarkable "Over-sea" railroad plan that has made Florida famous throughout the civilized world.

While it will take several years to accomplish the improvements authorized and planned, when they are completed the East Coast of Florida will have railway facilities at least equal to, and probably superior to any locality of similar importance in the United States. Even by January 1st, 1925, the value of the improvements already placed in service will be clearly perceptible to the traveler and the shipper. The projects authorized include:

HEAVIER RAIL:

Relaying the main line with rail weighing 90 pounds to the yard has been under way for some months, and by the beginning of the Winter tourist season of 1924-1925, the entire distance between Jacksonville and Miami will have been laid with this weight of rail.

SECOND MAIN TRACK:

Work on double tracking the main line between Jacksonville and Miami has been under way for some months at points where the greatest congestion has developed in the past, and a number of miles of this second track will be in service by January 1st, 1925. By that same date 15 new passing tracks, each of 90 cars capacity, will also be in service.

SAINT JOHNS RIVER BRIDGE:

The construction of the new double track bridge over the Saint Johns River, between Jacksonville and South Jacksonville, is progressing satisfactorily, all of the large piers now being completed. All the substructure work is expected to be finished by the latter part of November, 1924. Work on the fabrication of the superstructure has been going on since last March, and the first of the new steel girder spans were erected during the month of September, 1924. The change from the old to the new bridge will be effected without interruption to traffic.

LOCOMOTIVES:

Twenty huge Mountain type locomotives were added to the motive power equipment during the latter part of 1924. These are in addition to the 15 locomotives of a similar type, although somewhat less powerful, which were put into service during last December and January. Five new switching type locomotives, by far the most powerful ever used on this railway, were placed in service on August 20th, 1924.

MIAMI BELT LINE:

A 19-mile belt line around the City of Miami is already under construction. Its operation will greatly facilitate the movement of freight traffic into and through that territory, and will, as well, relieve the busy streets in the center of the City from much interruption now caused by running all trains over the present main tracks.

OKEECHOBEE-MIAMI EXTENSION:

The extension of the line from Okeechobee to Miami is progressing rapidly. Twenty miles of track have been in place for several months, and by January 1st, 1925, 35 miles of track south of Okeechobee will be in operation, and will serve a rapidly growing territory hitherto without rail transportation.

PASSENGER AND FREIGHT CARS:

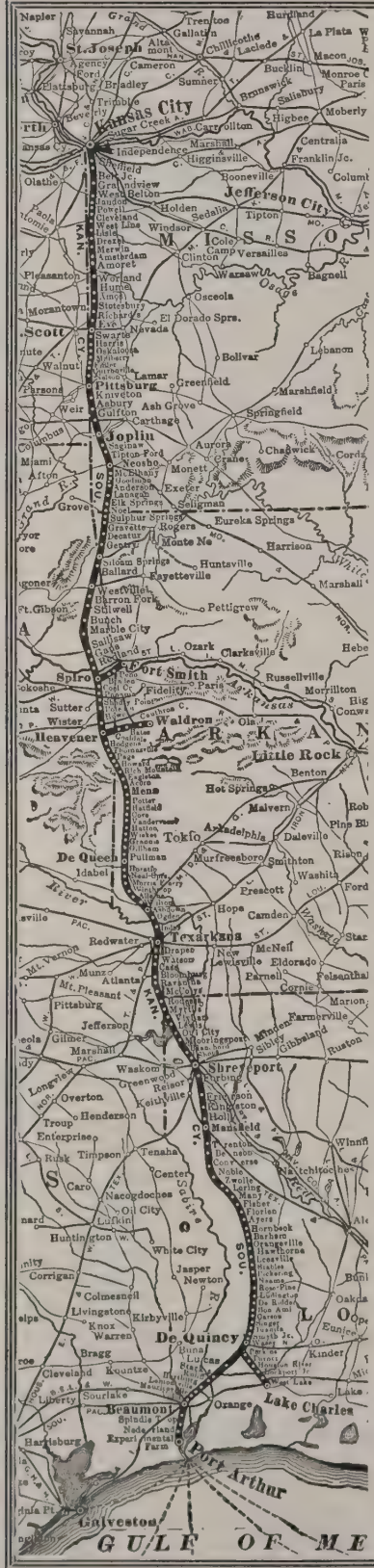
Orders have been placed for three steel passenger coaches, 20 caboose cars, 200 ventilated box cars, and 100 ballast cars, which will be delivered by the first of January, 1925. In addition to this equipment, 138 freight cars are being rebuilt in the Florida East Coast Railway shops, for use in rock service.

In addition to the large projects specifically referred to in the foregoing, there are a great number of others which, while small in themselves, will materially increase the capacity of this railway and its ability to more effectively and more satisfactorily serve the territory tributary to it. The Management has ever before it the rapid and substantial growth of this territory, and its wishes and intentions are to provide a transportation agency that will most adequately meet the many needs of the numerous and progressive communities served by it.

FLORIDA EAST COAST RAILWAY CO.

H. N. RODENBAUGH, *General Manager* FLAGLER SYSTEM GENERAL OFFICES: ST. AUGUSTINE, FLA.

No state income or inheritance taxes can be levied in Florida now.



THE KANSAS CITY SOUTHERN RAILWAY

TEXARKANA and FORT SMITH RAILWAY

THE SHORTEST ROUTE

FROM

KANSAS CITY, MO., TO TIDE-WATER AT BEAUMONT AND PORT ARTHUR, TEXAS, ALSO LAKE CHARLES, LA., WHERE WORK ON DEEP WATER IS UNDER PROGRESS

This railway traverses the States of Missouri, Kansas, Arkansas, Oklahoma, Louisiana and Texas, a country of varied and abundant resources, affording good opportunities in agricultural, commercial or industrial lines to those seeking new locations.

Lands are of good quality, moderate in price and convenient to good markets. They are well adapted to general farming, stock raising, dairying, as well as commercial fruit and truck cultivation. The agricultural production consists of wheat, corn, oats, cotton, rice, forage, apples, peaches, berries, cantaloupes, sweet potatoes and commercial truck.

The leading mineral resources are coal, lead, and zinc, valuable brick and potter's clays and shales, lime rock, cement material, slate, manganese, iron ores, lignite antimony, asphalt, petroleum, natural gas, tripoli, sulphur and mineral waters. Pine and hardwood timber is abundant.

The large cities, commercial and industrial centers served by this company are Kansas City, Mo., Pittsburg, Ks., Joplin, Mo., Fort Smith, Ark., Texarkana, Ark-Tex., Shreveport, La., Leesville, La., DeRidder, La., Lake Charles, La., Beaumount, Texas, Port Arthur, Texas.

The great area served by this line is only partly developed. There is room for many thousands of farmers. Raw materials, cheap fuel, good water and labor are available for several hundred factories of many kinds. It is the land of opportunity for those who have the will, energy and means to establish themselves.

For further information apply to

INDUSTRIAL OPPORTUNITIES
G. B. WOOD,
Assistant to President
Kansas City, Mo.

AGRICULTURAL
J. F. NEWSON,
Agricultural Development
Agent, Kansas City, Mo.

IMMIGRATION
S. G. WARNER, General Passenger Agent, Kansas City, Mo.

THERE ARE REAL OPPORTUNITIES HERE FOR MANUFACTURERS

The developed and potential resources of the section traversed by these lines, together with excellent transportation facilities, offer unusual advantages to those seeking choice industrial sites.

FOR INFORMATION WRITE

Commercial Development Department

Atlanta and West Point Rail Road Company
The Western Railway of Alabama
Georgia Railroad

120 East Hunter Street ATLANTA, GEORGIA

Alabama, Tennessee & Northern Railroad

SERVES WEST ALABAMA COUNTIES OF PICKENS, SUMTER, CHOCTAW, WASHINGTON *and* MOBILE

This line has opened to Home Seekers fertile lands at attractive values. Has brought into market many tracts virgin timber yet uncut, offering attractive locations for hardwood and pine manufacturing. Owns extensive Harbor Frontage at Mobile suitable for shipping and industrial plants, almost adjoining $10,000,000.00 State Docks now being constructed. We offer sites for lease or sale.

ADDRESS

JOHN T. COCHRANE, *President*
MOBILE, ALABAMA

Woodworking Industries

in locating South are invited to investigate the unusual manufacturing opportunities which exist at

GEORGETOWN
SOUTH CAROLINA

There is also an opportunity for the manufacture of kraft, book and magazine paper, because an unlimited supply of pulp wood is available.

A CANNING PLANT

due to the activities of the farmers in truck raising, and the fact that Georgetown is noted for its fisheries, will find this a good location. For data on labor, climate, transportation facilities, fuel, general living and economic conditions, write to the

CHAMBER *of* COMMERCE
GEORGETOWN SOUTH CAROLINA

Texas *and* Louisiana

are yearly growing in favor with people of the North who pass the winter in the South to avoid the rigors of the weather at home.

This section is also provided with all modern facilities and ideal living conditions for those seeking permanent homes, whether on farms or in the cities.

A perfect prelude to the many delights of the winter season at quaint New Orleans, the Bayou Teche Land of Evangeline, Houston, seaside Galveston and charming San Antonio is the

One Hundred Golden Hours at Sea

between New York and New Orleans on a comfortable oil-burning "Morgan Line" steamship of the

Southern Pacific Lines

For descriptive literature, information and reservations, address our General Agent at

165 Broadway, New York
294 Washington Street, Boston
1602 Chestnut Street, Philadelphia
or
Union Trust Building, Baltimore

SOUTHERN PACIFIC LINES

SANFORD

THE CITY SUBSTANTIAL

ONE MILLION DOLLARS NEEDED IN SANFORD IMMEDIATELY to relieve acute shortage of houses. Sanford is a lucrative field for investors desiring to loan money on first and second mortgages, backed by gilt edge A-1 collateral. Real estate absolutely free of inflation. Unusual opportunity offered for construction of apartment houses and modern resort hotel.

PERTINENT FACTS

Metropolitan City—Rail and Water Transportation, Population 10,433—86 per cent increase in four years. Assessed valuation increased 121 per cent in four years—$1,405,000 in bond issues voted during past year. Principal revenue derived from back country, from which 7646 cars of winter vegetables were shipped last year.

Sanford's distinction as a typical American city, free from objectionable foreign influences, makes it especially attractive to a high class of people. For further details write Investment Department

CHAMBER OF COMMERCE

FLORIDA

PETERSBURG
VIRGINIA

With

EFFICIENT CITY MANAGER FORM OF GOVERNMENT
CHEAP HYDRO-ELECTRIC POWER
INTELLIGENT AND STABLE AMERICAN LABOR
CHEAP FUEL
REASONABLE COST OF LIVING
REASONABLE MONTHLY RENT PER ROOM
EXCELLENT CLIMATE

IS AN IDEAL LOCATION *for* FACTORIES

We shall be very glad to serve you and welcome you to "The Friendly City" of the South.

CHAMBER *of* COMMERCE

MISSISSIPPI

and the Mississippi Development Board

AN ORGANIZATION THAT IS GIVING SERVICE AND GETTING RESULTS BY GOING TO THE BOTTOM OF THE STATE'S DEVELOPMENT PROBLEMS

T. J. Wills

Lamar Hennington

Charles Green

J. T. Rankin

J. B. Bishop

G. S. Harmon

BACK in the year of 1921 there came together in the city of Hattiesburg, Mississippi, a group of far-sighted, public-spirited and constructive-thinking men, determined upon the pursuit of a purpose in bringing about, through a process of co-operation, a general trend of constructive development in agricultural, industrial and economic fields and the furtherance of the common welfare of South Mississippi.

Out of this gathering there was born an idea for an organization of sincere endeavor, an organization that could study comprehensively and act intelligently upon the vital needs of a great potential section, administering through close contact and enlightening co-operation a means of making possible real attainment and progress, to which this great section by virtue of its natural advantages, was entitled.

This organization became known as the Mississippi Development Board, and immediately following its creation the summary of its purposes was moulded into a program, and with commendable initiative the Board, with a working organization of competent people, went forward in the service of the section for which is was created.

As the early work of the Board successfully progressed, and the people became closer associated with its unselfish aims and its splendid accomplishments, the Board found the fruits of its labors not only in the appreciation of its first field but in the recognition of other sections, followed by requests to extend its operations and lend its services in general work of a state-wide character.

In its new role of a state organization the Board faced the facts concerning the state by dealing with the fundamentals. In this particular it sought through a program of constructive information a general prevalence of unified thought among the citizens, with a view of popularizing constructive legislation, for the betterment of agriculture, industry and all other elements of state progress.

H. S. Weston
President
Logtown

J. F. Borthwick

In the building of its organization the Board has been fortunate in procuring from its Directors and members, men who possess unselfish ambition in seeing Mississippi sweep ahead into an era of progress equaling that of any state in the Union, and in the framing and pursuance of its policy they have met the issues detrimental to state advancement in a frank and fearless manner, evidencing only the true spirit of patriotic pride in the obligation that they have assumed.

The Mississippi Development Board is performing a public service that is bringing it recognition not only as the outstanding organization in Mississippi, but equally as resultful in this character of public work as any organization in the South. In this it is gradually developing a greater degree of efficiency for maintaing close co-operation with the individual sections, yet continuing to perform uninterruptedly in matters that are distinctively state-wide.

Since its organization four years ago the Board has demonstrated its ability to function with creditable expediency. Among the most important work with which the Board is prominently associated is a constant relationship with governmental affairs affecting the state, among which has been its efforts to secure the recognition of the Government for including Mississippi and the South in its national reclamation program. From the time Muscle Shoals became a question of national importance the Board has waged a continuous fight in the interest of securing proper disposition of this property and an equitable distribution of power to safeguard Mississippi's potential development in agriculture and industry. Active efforts have been the measure of its interest in securing worthwhile settlers for the state through the establishing of reasonable homeseeker's rates on Southern railroads; promotion of fine stock raising and dairying, and the protection of this industry through the extermination of the cattle tick and the adoption of the stock law; promoting individual and community poultry raising; diversified farming; modern marketing; colonization and immigration; community organization; good roads; better health measures, and many other things upon which the progress of the state is dependent, the promotion of which calls for organization. Only recently the Board promoted the annual "Made-in-Mississippi Products Week," November 3 to 8, which has culminated with splendid results, the entire state participating for a new program of producing more and consuming more Mississippi products. Few organizations in the South are doing any more in the general development of the sections and the states than is the Mississippi Development Board in its development work in Mississippi.

MISSISSIPPI STATE HOUSE AT JACKSON

Encouraging co-operation, optimism and appreciation among the citizens of the state, working with undivided interest with those problems affecting the state that must be met by organization, it is going to the bottom of these problems, analyzing them, and forging ahead with rapidity in effecting results in its determination to make Mississippi unquestionably the banner state of the South.

For further information write Mississippi Development Board, Hattiesburg, Miss.

L. J. Polse

Flint Wilson

S. E. Moreton

L. O. Crosby

F. W. Foote

J. M. Bissell

R. I. [illegible]

Jake Klumb

BALTIMORE

Has Over $500,000,000 Invested in Southern Railroads, State and Municipal Securities and Business Properties of Various Kinds

BALTIMORE is a part of the South—geographically and commercially. It stands at the gateway where the traffic and the wealth of both North and South must meet. Its growth as a seaport, as a manufacturing center and as a jobbing center is keeping it at the forefront of progressive American cities. In addition to its exceptional geographic location, Baltimore has a harbor that comprises 127 miles of deep water frontage, with 45 miles improved and 82 additional miles available for development, and a channel 35 feet in depth to the sea.

There is a water front storage space of nearly 3,000,000 square feet, divided almost equally between warehouse space, covered and open pier space.

Located at this harbor are the terminals of three trunk line railroads with trackage in the belt totaling 373 miles for storing 24,000 freight cars.

The most modern facilities for handling grain, coal, oil, sulphur, fertilizer and freight of all kinds are provided.

Baltimore's coal loading capacity unequalled anywhere

Baltimore's coal piers have a combined loading capacity of 80,000 tons in ten hours.

Five grain elevators, with a storage capacity of 12,500,000 bushels give Baltimore third place in the grain exporting ports of North America. Last year's shipment of over 43,118,000 bushels was exceeded only by Montreal and New York.

Baltimore as a port ranks second on the Atlantic Seaboard and third of all the ports in the United States.

A city of 800,000, it has capital invested in manufacturing plants of more than $500,000,000 and the value of manufactured products as long ago as 1919 reached a total of nearly $700,000,000. Situated in close proximity to the coal fields of Maryland, West Virginia and Pennsylvania, coal costs are reasonable. Fuel oil is available in abundance; while the city has large refineries with a total combined capacity of 60,000 barrels daily.

The cost of gas and electricity is lower than that of any other seaport city and lower than the majority of cities in the United States.

There have been invested in improvements in public utilities more than $10,000,000 in 1924.

Baltimore as a home-owning city

Building permits in 1924 will exceed $50,000,000. In the first ten months of this year permits were issued for 4,400 separate dwellings, and since 1919 permits have been issued for dwellings with a valuation exceeding $76,000,000.

Sixty-two per cent of the houses are occupied by their owners, and this percentage is higher than that reached by any other industrial city of the United States.

The port of Baltimore

The port has 38 regular steamship lines and 61 regular steamship sailings reaching more than 100 foreign ports.

The value of water borne commerce for 1924 will closely approximate $1,000,000,000. The tonnage westward through the Panama Canal for 1923 for the port of Baltimore exceeded that of any other Atlantic or Gulf port.

BALTIMORE

The Most Inviting City in America for Manufacturers

TO care for its shipping there are 16 shipbuilding and repair plants, 8 drydocks—the largest being 130 by 600 feet —10 marine railways and a 20,000-ton floating drydock operated by the Bethlehem Shipbuilding Corporation.

More than $21,000,000 have been expended in harbor improvements. In 1920 $52,500,000 was voted for port developments, which is now being administered by a Port Development Commission, under whose plans harbor construction may be undertaken on a lease basis which will insure rentals over a period of years at rates sufficient to meet the interest and sinking fund charges. Under this comprehensive policy, projects are already outlined that will cost upwards of $100,000,000 and will increase the port capacity to four and a half times its capacity in 1920.

Baltimore boasts one of the best harbors on the Atlantic Seaboard. Its storage, loading and shipping facilities are thoroughly modern and sufficient, and anchorage space is abundant. Vessels of the largest size are berthed with ease. The port is open the year round; interference from ice is negligible.

The confidence of Baltimore people

in Baltimore's ultimate growth is shown in their having voted in the past five years loans aggregating $88,250,000 for schools, sewers, water supply and other municipal improvements—and this is entirely outside of the amount voted for port development. The city's water supply was recently enlarged at a cost of $25,000,000 and there is now abundant capacity to care for a city of twice its present size.

Low food costs, exceptional living conditions, abundance of efficient labor and an atmosphere that makes Baltimore's charm peculiarly its own, invite the manufacturer and the merchant. Strikes during 1923 caused a loss of only .053 of 1% of production time.

In spite of high wages and the high cost of everything, which are common the country over in these times of prosperity, the tax rate of Baltimore for the next year, due to the careful administration of its business affairs, will be 10% less than it has been in recent years. This is to be the profit which the citizens of Baltimore, as shareholders in the enterprise, may expect from their investment.

The story could go on indefinitely

It could tell of the program of the Bethlehem Steel Company, which will reach $100,000,000 before its improvements are finished; of the location here of the American Sugar Refining Company with its $10,000,000 plant; of the United States Industrial Alcohol Company—the largest plant of its kind in the world; of the Baltimore Copper Smelting & Rolling Company; the new distributing plant of Montgomery, Ward & Company at a cost of $2,000,000; of the $4,000,000 plant of the Standard Sanitary Manufacturing Company; and $2,000,000 to be spent for a new plant by the N. K. Fairbank Co., manufacturers of the famous Gold Dust Twins products, and many others. But the story may perhaps best be summed up in the words of Earl D. Babst, President of the American Sugar Refining Company, who, after a thorough investigation of other ports and conditions in other cities, made this statement: "Nowhere in America, as far as I know, are the living conditions for every man, woman and child, no matter what their situation in life, as comfortable and inviting as those provided in Baltimore." It will be a pleasure to answer inquiries.

HOWARD W. JACKSON, *Mayor*

Cultural and Industrial Centre

UNIVERSITY OF CINCINNATI AND CAMPANILE OF WITHROW HIGH SCHOOL

CINCINNATI, Gateway to the South and termed by Longfellow, "Queen City of the West," is an educational and cultural centre of long standing. Art has flourished in Cincinnati for generations. It was one of the first American cities to establish an art museum and academy and it is the home of Rockwood Pottery. The Cincinnati Symphony Orchestra, internationally famed, and the May Festivals, held bi-annually, attract music lovers from afar. Its musical and educational institutions are internationally recognized for their merit and they, together with the municipally owned University of Cincinnati and other schools and colleges of note, attract students from every part of America and the globe.

Cincinnati's educational and municipal institutions serve as models of their kind and attract world-wide attention. This cultural atmosphere naturally has its effect upon every Cincinnatian at an early age. It is largely due to this, that artistry and precision are so manifest in industry and that Cincinnati-made products are distinguished by their excellence and meet a ready demand.

Cincinnati can manufacture and distribute more economically than many other cities due to contented skilled labor, pleasant living and home conditions and because of its central geographical location, proximity to the center of population and ideal transportation facilities by rail, river and highway. Cincinnati is a logical industrial centre and occupies an unapproachable position for best serving the South and its needs.

CINCINNATI
CHAMBER OF COMMERCE

CINCINNATI
The Gateway to the South

ASTRIDE the "Mason and Dixon Line," Cincinnati, since the earliest days of its history, has been recognized as the Gateway to the South. Due to strategic geographical location and unexcelled transportation facilities, it is certain of retaining that distinction and trust.

The South's prosperity and development vitally concerns Cincinnati Cincinnatians appreciate their obligation to the South. Now, as in the past, they are motivated by the impulse to serve and assist their Southern neighbors, to the mutual benefit of both. Their interest in the welfare of the South has been tangibly demonstrated in many ways

When the rich natural resources now being developed along the line of the Cincinnati Southern Railway lay untouched for want of transportation facilities, Cincinnatians built that connecting link, 339 miles in length to Chattanooga, and it remains the city's property. The development of the Dixie Highway received the support of Cincinnatians from its very inception Thru Good Will Tours and other means, Cincinnati has and continues to make every effort to further cement friendly relations with the South and legislation aimed to benefit it invariably receives the sympathetic and whole-hearted support of Cincinnatians.

Cincinnatians believe in the future of the South. With their neighbors, they visualize that wealthy section of our great country enjoying a prosperity from its developed resources the like of which has never been surpassed in the world's history. They hope to provide further assistance in that development, and as opportunities present may be depended upon for maximum response.

CINCINNATI
CHAMBER OF COMMERCE

JACKSONVILLE, FLORIDA

The PORT METROPOLIS of the South Atlantic, the Gateway to America's playground, invites you to join the one hundred and twenty-nine thousand live wires who are now building for a city of two hundred and fifty thousand population by 1930.

JACKSONVILLE'S bank clearings increased from $12,733,049 in 1900 to $653,380,323 in 1924—a gain of 5400 per cent. Bank deposits have grown from six to one hundred million dollars in the same period of time

JACKSONVILLE'S municipal electric light and water plant and docks show a net earning of approximately $800,000—or a net saving to the taxpayers of over ten mills this year.

JACKSONVILLE is the largest naval stores concentration yard in the world. THIRTY FEET of water from the Atlantic Ocean to our docks makes it possible for ten thousand-ton vessels to call at this port.

JACKSONVILLE'S payrolls total fifteen million dollars per annum.

JACKSONVILLE'S industries manufacture products valued at fifty million dollars per year.

JACKSONVILLE ships fifty-five thousand carloads of lumber, or a billion feet each year, leading the entire South in this commodity.

EIGHTY PER CENT of Florida fertilizer production is made in Jacksonville.

JACKSONVILLE is the county seat of Duval County, which is spending three million dollars this year on paved highways.

A THIRTY-TWO-FOOT PAVED HIGHWAY, extending from Jacksonville to its beaches, is electric-lighted, the longest suburban white-way system in the United States.

HENRY FORD is spending two million dollars in Jacksonville on an assembling plant. If it is good enough for Henry Ford it should be good enough for you.

JACKSONVILLE is the home of the largest coffee roasters in the United States, the Cheek-Neal Coffee Company.

JACKSONVILLE'S municipal golf course is open to all visitors.

FOR FURTHER

The City Advertising Committee,

"THE FRIENDLY CITY"

JACKSONVILLE, FLORIDA, furnishes to its citizens the lowest electric power rates in the United States with one possible exception, and yet its municipal electric light and water plants show a net earning of over $625,000 per year. In 1893, the City was authorized by the State Legislature to issue $1,000,000.00 worth of improvement bonds, $75,000.00 of which was specifically set aside for the purpose of building and equipping an electric light plant. From the proceeds of this issue, the construction of the plant was begun in 1894, completed in 1895 and begun operation under the supervision of that branch of the City Government then known as the Board of Public Works. This Board continued to operate the plant until June, 1899, at which time the management passed into the hands of the Board of Bond Trustees, and since the 1917 charter amendment, the plant has been under the supervision of the City Commission. In addition to the original bonds of $75,000.00, a new issue of $27,500.00 in 1901, another of $100,000.00 in 1913, and Improvement Certificates amounting to $850,000.00 issued in 1923, were sold, making a total of $1,052,500.00 actually outstanding against the plant at this time. In 1912, a new plant was erected and changes made in the old plant (now used as a substation), at a cost of approximately $635,000.00. The plant in 29 years has not only earned enough to make all necessary improvements and pay operating expenses, but in addition thereto, up to December 31, 1923, turned over to the City Treasurer an amount in excess of $3,350,000.00 for General Fund and Sinking Fund purposes. It is worth over $3,225,000.00 and has proven to be the most valuable asset the City owns. Not only does it deliver current to the consumers at a very reasonable rate, one much lower than the average plant charges, but it saves the tax payers at least 6 or 7 mills annual tax by reason of transfers made to the general fund. No assessments have been made on account of the construction cost of the plant, but, as stated, bonds were sold, and the plant has long since repaid the tax payers many times more in profits. The rates now in effect are practically the same as for a number of years past, except slight changes in those on power. The gross earnings for 1923 amounted to $1,300,000.00. The operating expenses were $646,626.00, the net earnings for the year were consequently $653,784.00, and the cash on hand in this department December 31, was $762,164.00. The gross earnings for the electric light plant for twenty-five years amounted to $12,403,747.09, operating expenses during same period of time $5,424,772.25, net earnings $6,978,974.84, extensions and improvements $3,758,940.12; and turned over to the City Treasurer since 1899, $2,753,396.16 for general purposes, being from 1899 to 1916 the sum of $977,391.83 and in the last seven years an additional sum of $2,226,504.33.

Rates Charged for Electricity

The rates for residential lighting and cooking are 7c per k.w.h. for the first 35, 5c per k.w.h. for the next 40 and 2c per k.w.h. for all in excess of 75 k.w.h. consumption, subject to minimum charge of $1.00 per month. Outside the city limits the rates are 10c per k.w.h. for the first 35, 7c per k.w.h. for the next 40 and 3c per k.w.h. for all in excess of 75 k.w.h. consumption, subject to minimum charge of $1.50 per month. The rates for commercial cooking and heating in city limits are 3c per k.w.h. for the first 500, 2½c per k.w.h. for the next 4000, 2c per k.w.h. for the next 5000 and 1½c per k.w.h. for all in excess of 9500 k.w.h. consumption, subject to a minimum charge of $5.00 per month. Outside the City limits the rates are 4½c per k.w.h. for the first 500, 3¾c per k.w.h. for the next 4000, 3c per k.w.h. for the next 5000 and 2½c per k.w.h. for all in excess of 9500 k.w.h. consumption, subject to a minimum charge of $7.50 per month.

Power Rates

The rates for 2200 volt alternating 60 cycle current are as follows, subject to minimum consumption of 5000 k.w. per month. All wiring from main line to meter to be paid for by applicant; 2c per k.w. for the first 10,000 k.w. used per month, 1.75c per k.w. for the next 15,000 k.w. used per month, 1.50c per k.w. for the next 50,000 k.w. used per month, 1.25c per k.w. for the next 75,000 k.w. used per month.

Jacksonville owns its own municipal docks and terminals, which represent an investment of over $2,000,000 and upon which $1,000,000 additional is now being spent to increase their facilities.

Jacksonville's municipal golf course with 18 holes is one of the finest in the country and is easily accessible to the business district, yet situated so as to provide ideal semi-tropical settings. All visitors so inclined, are invited to take advantage of the course while in the city and at a nominal fee. An additional 18 hole course is now in process of being constructed.

INFORMATION ADDRESS

City Hall, Jacksonville, Florida

MIAMI - FLORIDA

Leads All Southern Cities in Development

WORLD'S GREATEST WINTER RESORT

In the Tropical Zone of Florida
Where the Cocoanuts Grow

Enjoyed by 300,000 visitors yearly.

Every summertime sport in a climate that's always June.

Eight golf courses; $750,000 horse-racing park; four polo fields; the fisherman's paradise; surf bathing 365 days in the year, temperature of sea in mid-winter 72 degrees.

115 hotels, 350 apartment houses, 5,000 furnished bungalows.

MUNICIPAL DOCKS AT MIAMI

INDUSTRY AND AGRICULTURE

A quarter of a million acres of rich muck soil for sugar cane growing; $1,500,000 sugar mill and refinery now in operation.

Winter vegetables, grapefruit, oranges, avocadoes and other tropical products yield growers of Dade County $12,000,000 annually.

Dairying represents an investment of $2,500,000.

150,000 acres now ready for farming, dairying or fruit growing.

Commercial moving-picture studio; investment, $500,000.

Furniture and woodworking plants, canning and preserving, cement block, cigars, candy, mattresses, etc.

SHIPPING AND TRANSPORTATION

Municipal docks and warehouses, with channel 18 feet deep, 100 feet wide, extending four and one-half miles across Biscayne Bay to deep ocean water. Depth of 25 feet and 200 feet width approved by United States Army Engineers.

Passenger and freight steamship lines from New York, Baltimore, Charleston, Jacksonville, New Orleans, Nassau and the Bahamas. More than 100,000 tons fuel oil imported in 1923.

On main line of Florida East Coast, and junction of Okeechobee branch line, now being constructed.

Modern and extensive mercantile establishments. More than 100 wholesalers and jobbers.

FLAGLER STREET, MIAMI

COMPARATIVE STATISTICS

Population

1894	15
1900	1,681
1910	5,471
1920	29,549
1924	75,000

A gain of 5,000 per cent in 30 years. United States census gain (1900-1920) of 1,657 per cent.

Property Valuation for Assessment

1910	$ 1,506,183
1915	13,029,343
1920	52,234,550
1924	87,469,874

(Actual valuation $175,000,000.)
A gain of 5,707 per cent in 14 years.

Building Permits

1913	$ 545,870
1915	769,040
1920	4,556,365
1923	7,201,266

Building Permits—Continued

1924 (10 months)	14,856,124

A gain of 2,436 per cent in 10 years. (Building in Greater Miami 1924—$30,000,000.)

Bank Deposits

1913	$ 3,277,149
1915	3,339,927
1920	17,299,090
1923	31,347,768
1924	46,233,256

(First quarter each year.)
A gain of 1,310 per cent in 10 years.

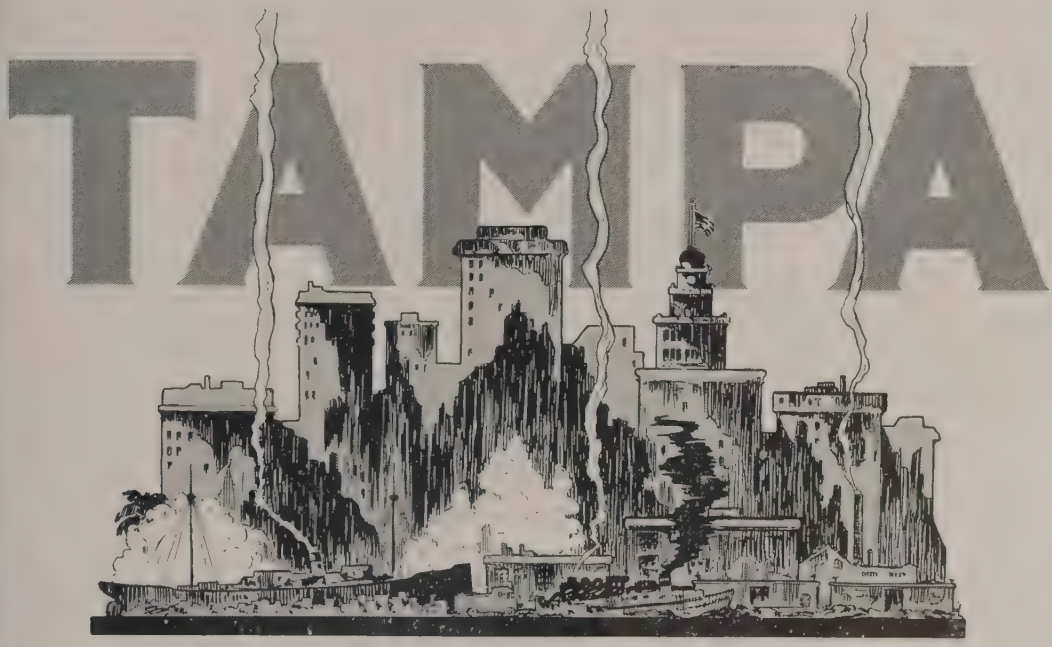
Post Office Receipts

1914	$ 67,547.62
1915	71,033.75
1920	203,956.63
1923	301,657.88
1924	414,380.96

(For fiscal year ending June 30th.)
A gain of 513 per cent in 10 years.

For special information or free illustrated booklets address

MIAMI CHAMBER OF COMMERCE MIAMI, FLORIDA



Rising Metropolis *of* Florida

TAMPA is now spending $36,000,000 for public improvements and through private building enterprise.

For a city of Tampa's present size this is an enormously large expenditure—though it is only a small part of its general development program.

Tampa and its trading territory have in the past year experienced better business conditions than any other section of the country.

Continued prosperity is assured by the fast growing port, the development of South Florida's great fruit and vegetable industries, and the increasing multitudes who each year enjoy its incomparable climate and scenic attractions.

Roger W. Babson, nationally known financial observer, and B. C. Forbes, famous writer on business conditions, have predicted that Tampa will be one of the most important cities in the South. Other noted men have expressed similar views.

Exceptional opportunities for investment and establishment of new commercial projects are here for those who are alert to visualize the future of this great metropolis. Detailed information on Tampa's resources and natural advantages will be gladly furnished on request.

TAMPA BOARD OF TRADE

TAMPA (*Box T-407*) FLORIDA

"The City of Things to See"

ST. AUGUSTINE

America's Original Tourist City

THE MONSON HOTEL

ON THE WATERFRONT

ST. AUGUSTINE FLORIDA

A charming new Hotel well maintained and operated under ownership management. Located on Matanzas Bay, overlooking the Atlantic Ocean.

OPEN ALL YEAR WRITE FOR BOOKLET, TERMS, ETC.

CHAS. E. YOUNG

EUGENE L. BARNES & SON

REALTORS *and* INSURORS

CITY AND COUNTRY PROPERTY

both developed and undeveloped, for sale and rent. Wonderful Hotel Site next to South's Best Golf Course

210 St. George Street St. Augustine, Florida

ROBERT P. KETTLE

REALTOR and INSUROR

CITY AND COUNTRY PROPERTIES
SUB-DIVISIONS

10 CATHEDRAL STREET

ST. AUGUSTINE FLORIDA

LEILA M. SNOW & SON

REALTORS *and* INSURORS

OCEAN FRONT PROPERTY

122 Charlotte Street ST. AUGUSTINE, FLORIDA

SERVICE

"At the Sign of the Lighthouse"

The ST. AUGUSTINE
NATIONAL BANK

ST. AUGUSTINE FLORIDA

Invites You—

TO rest and play amid its historical charm and enjoy its invigorating climate. Those seeking an ideal resort find here many advantages, while the person who wishes a permanent residence place in the "land of sunshine" will find an appealing atmosphere in St. Augustine. Many potential possibilities await the investor who would participate in the rapid and substantial growth of Florida in and around the "Ancient City."

—St. Augustine affords the finest of hotel accommodations, and a wide range of modern apartments.

—St. Augustine has the BEST GOLF CLIMATE IN THE WORLD, "just right" for a snappy game at all times. Three superb courses furnish unexcelled playing facilities.

—St. Augustine offers an unusual and varied program of sports and athletic events under professional direction.

—St. Augustine abounds in historic scenery of a type not found elsewhere.

—St. Augustine enjoys excellent fresh water and deep sea fishing, also boating.

—St. Augustine prides itself for clean paved streets, beautiful parkways, school system and modern utilities.

—St. Augustine has three wonderful beaches, which add to its many attractions.

—St. Augustine is the county seat of one of Florida's best agricultural counties, and is open for large development today.

PONCE de LEON CELEBRATION

April 2d, 3d and 4th, 1925

This three-day historical pageant depicting the discovery of Florida, the founding of St. Augustine and other interpolations, is different from anything of its kind and should be witnessed by everyone.

ST. AUGUSTINE BOARD *of* TRADE

ST. AUGUSTINE, FLORIDA

The Speedway Beach

At Ormond-Seabreeze-Daytona Beach

FLORIDA

Is One of the Wonders of the North American Continent

IT is only one of the many wonders of these delightful sister towns, situated on a peninsula 3000 feet wide, lying between the sparkling waters of the Halifax River and the Atlantic Ocean, across the river from the beautiful city of Daytona.

WINTER SURF BATHING

BOATING	HORSEBACK RIDING
GOLFING	FISHING
TENNIS	SHOOTING

MOTORING on delightful roads past famous orange groves and spots of interest may be enjoyed.

THE SEABREEZE-DAYTONA BEACH ASSOCIATION

DAYTONA BEACH FLORIDA

INVITES YOU

A City That Has Grown Like Aladdin's Castle

In the past four years St. Petersburg, Florida, the famous Sunshine City, has had the following amazing growth—

210 per cent increase in population
Resident population now 30,000
Estimated winter population, 100,000

300 per cent increase in annual building permits
$6,358,000 for first nine months of 1924

220 per cent increase in assessed valuations
Present assessed valuation, $68,315,477
(Tax rate 11 mills on a 60% valuation)

330 per cent increase in bank deposits
$19,901,944, first 3 months of 1924

St. Petersburg has an area of 27.3 square miles. Its ten public parks cover 142 acres. It has 100 miles of paved streets and 45 more miles are under construction. Since January, 1921, this city has expended $25,500,000 in buildings and public improvements.

These few figures are presented as convincing evidence of the sound growth and prosperity of St. Petersburg and its popularity as a winter resort. They serve to indicate that the rare advantages for rest and recreation offered by the famous Sunshine City are equalled only by its opportunities for business and investment. For complete information regarding the resort advantages or business possibilities of St. Petersburg, address M. K. DILLMAN, Chamber of Commerce.

St. Petersburg

The Sunshine City FLORIDA

The Redland District

of FLORIDA On the Lower East Coast

"Home *of the* Avocado"

Where winter blizzards become a remote memory. A land of sunny groves, fertile farms and glorious climate, inviting the seeker of health and prosperity to share its blessings.

Typical of Florida's magical growth and progress is the rapid yet substantial development of the Redland District, the richest agricultural and horticultural section of the Sunshine State.

TEN YEARS AGO

A sparsely settled sub-tropical region of Caribbean pine, palmetto and potentially rich prairie, basking in South Florida sunshine and swept by the cooling trade winds from Gulf to Atlantic. Unawakened to opportunity and awaiting the skilled toil of the pioneer developer.

THE REDLAND DISTRICT TODAY

A prosperous, well-developed community, populated by a high-class, cosmopolitan citizenry drawn from every state in the Union.

Splendid system of highways. 300 miles of hard-surfaced roads, most of them oiled, within an area fifteen miles square.

Sparkling water of the purest quality. 200,000 gallons shipped daily to points one hundred miles away. Quarries of native limestone rock, unequalled for road building and concrete construction work.

The natural home of the famous avocado. Production greater and quality finer than any other section of the United States.

The superfine qualities of Redland District grapefruit and oranges are recognized throughout the country.

The greatest winter tomato growing section in the world.

High-class schools, modernly equipped and efficiently staffed. Churches of all denominations. All fraternal orders strongly represented.

Twenty-five modern fruit and vegetable packing houses.

Wide-awake Chamber of Commerce and active Rotary Club.

Two banks with aggregate deposits of one million dollars. Two newspapers, up-to-date stores, efficient fire department, electric light and power plant, extensive telephone system. $300,000.00 water works and sewerage system now under construction. Municipal bonds for this project sold at fraction over 99% of par value.

Nine-hole golf course, one of the best in South Florida, nearing completion. Hunting and fishing galore, warranted to satisfy the most ardent sportsman.

To the capitalist and developer the Redland District, yet in its commercial infancy, offers an unlimited field for profitable investment.

To the farmer and Homeseeker, business and professional man the Redland District offers the opportunity for an ideal permanent home, a satisfactory income, and living conditions impossible to equal elsewhere.

On the Dixie Highway and Florida East Coast Railway, thirty miles south of Miami. Northern terminus of the Ingraham Highway to Cape Sable and the Key Largo oversea Highway to the Florida Keys.

Inquiries welcomed and courteously answered without delay by

Chamber of Commerce Building

Redland District Chamber *of* Commerce

HOMESTEAD, FLORIDA

"Thirty Miles South of Miami"

MANATEE COUNTY FLORIDA

The Garden Spot of the Garden State

A LAND of orange and grapefruit groves and vegetable gardens in the great land of sunshine and happiness.

A combination of soils—muck, hammock, pine and prairie lands—all distinctive and highly profitable for cultivation of varied crops.

A coast line of 150 miles, including Gulf, bays and rivers, furnishing unusual protection for fruits and winter vegetables.

Marketing facilities for both large and small investors.

Transportation is the very best with the Seaboard Air Line Railway, the Atlantic Coast Line Railway and a daily boat service to Tampa and St. Petersburg.

Manatee County, with its wonderful hard roads throughout the county, touching bays, rivers and Gulf, through groves, gardens and semi-tropical forests, has unexcelled attractions for the motorist.

The cities of Bradenton, Manatee and Palmetto are modern in every respect and virtually one city, nestled together on the picturesque Manatee River, and offer the very best accommodations in hotels, apartments and outdoor amusements.

In the important matter of schools, churches, stores, hotels, banks and professional services, Manatee County ranks second to none.

Outdoor life is at its best. Fishing, surf bathing, boating and golf. The climate is ideal the year around.

For further information address

Manatee County Publicity Department

BRADENTON BOX 19 FLORIDA

WHY FORT WORTH?

MEAT animals, cotton, grain and petroleum valued at more than one-half a billion dollars per year are produced in Fort Worth's trade territory and marketed through Fort Worth. These are four of the five principal raw materials entering into American manufactures

The annual value of manufactures produced in Tarrant County, of which Fort Worth is the county seat, is thirty-nine million dollars greater than that of any other county southwest of Kansas City.

Labor costs are 40% lower than in Northern and Eastern territory. Mild climate, cheap fuel and a bountiful food supply from the immediate territory make possible a high standard of living at lowest cost. Eighty-five per cent of industrial employees are working under open shop conditions.

Cheapest fuel market in the United States. Natural gas from fifteen distinct fields, fuel oil from eight local refineries and bituminous coal from large fields within a radius of fifty miles compete in this market.

Largest electric power plant in the Southwest. Engineers' reports show that electric power from steam can be produced here at a saving of 30 per cent under cost of production in Piedmont district.

Water supply from largest municipally owned reservoir west of the Mississippi.

Eighteen trunk line railway outlets, with daily package car service over each.

The 1920 census showed 131 cities with more than 2500 population in Texas and Oklahoma. To sixty-nine of these Fort Worth has advantage in rates over any competing city; to thirty-three rates are equal, and to thirty-nine Fort Worth's nearest competing city has an advantage.

Census Bureau estimate as of July 1st, 1924, shows Fort Worth to have gained 39% in population since the 1920 census. A correct index of purchasing power in Fort Worth's preferential rate territory shows an increase of 166% in the same period. Within a seventy-five mile radius there is a population of one million and within a 125 mile radius a population of two million.

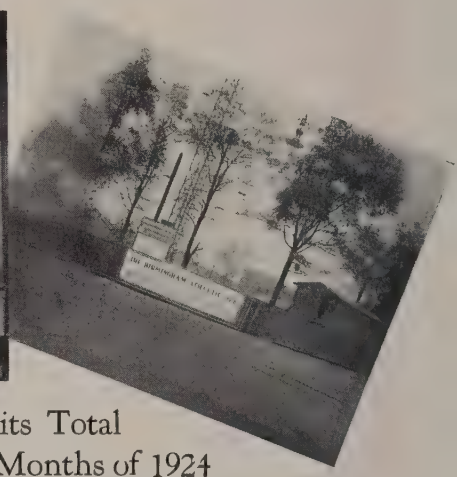
Only two cities in the United States have as low a death rate as Fort Worth.

Detailed Brief Furnished Upon Request

Fort Worth Chamber of Commerce FORT WORTH TEXAS

BIRMINGHAM

The Industrial Giant of the South!



Building Permits Total
the First Ten Months of 1924

$16,030,613.00

for all classes of construction—5061 permits—7354 structures of all kinds—an increase in total value over the same period of 1923 of $6,596,480.00, a large part of which is represented by the cost of the sky-scraper business buildings (five of which are shown on this page) all under construction within a radius of five blocks in Birmingham's business area.

THIS TREMENDOUS BUILDING ACTIVITY

indicates the rapidity with which this young giant is attaining the strength and grace of maturity—and the wonderful opportunities which now await the investor in Birmingham Realty and Industry, or the manufacturer who builds his factory here.

Birmingham has unexcelled transportation—unmatched natural resources—a climate both healthful and delightful—unrivalled educational and social advantages—and an abundance of good labor!

Come to Birmingham *now,* and ride on the crest of the great wave which is sweeping her irresistibly into leadership in business, industry, manufacture and culture. Write us for information as to Birmingham's opportunities for *you.*

Birmingham Chamber of Commerce

2015 Fifth Avenue BIRMINGHAM, ALABAMA

SAVANNAH

"The Hub of the New South"

HAS—

1. An abundance of cheap, contented labor.
2. The best deep-water harbor on the South Atlantic.
3. Unsurpassed rail and water transit facilities.
4. Low rail and water rates on raw materials.
5. Most desirable industrial sites at low cost.
6. Most advantageous location for Southeast distribution.
7. An ideal 365-day-year climate for industry.

For information write

THE BOARD OF TRADE
SAVANNAH - - - - - GEORGIA

CHATTANOOGA

A MANUFACTURER USING AS RAW MATERIAL
IRON ORE, COKE, COAL, LUMBER, COTTON, BAUXITE,
BRICK SHALE, LIMESTONE OR PORCELAIN CLAY

will find, on investigation, all those materials in a close carrying charge of Chattanooga, backed with ample banking facilities, satisfying transportation, year-round climate, that coaxes the best out of man.

Labor conditions that will appeal because of fairness and dependability. A safe surplus of Hydro-Electric Power and unlimited power possibilities that can and will be developed as needs demand.

Schools and churches have shared liberally in Chattanooga's industrial growth.

The tourist will find it an especially attractive city in both scenic and historical interests.

WRITE CHAMBER OF COMMERCE
CHATTANOOGA, TENNESSEE

ALBANY, GEORGIA

"THE WORLD'S PECAN CENTER"

The Metropolis of The Rich Agricultural Empire of Southwest Georgia

Look Albany Up on the Map and You Will Understand Why It Is Destined to Be a Great City

Albany is growing steadily and substantially as a retail trading center, as a jobbing center and as a manufacturing center.

PLANT OF GEORGIA-ALABAMA POWER COMPANY AT ALBANY

Ideal Location For Paper Pulp Manufacturing

Inexhaustible supply of Short Leaf Pine, Red Gum, Poplar, etc., at very door.

PURE WATER IN ABUNDANCE

12,500 Hydro-Electric Horsepower

Rare Opportunities Are Beckoning You To Albany, Georgia.

Come and Grow With Us!

FOR DETAILED FACTS AND INFORMATION, WRITE

THE ALBANY CHAMBER OF COMMERCE, Albany, Georgia

REYNOLDS BROS. LUMBER COMPANY

MANUFACTURERS OF

HARDWOOD LUMBER

Annual Production 16,000,000 Feet

FARM LANDS FOR SALE

WRITE FOR PARTICULARS

REYNOLDS BROS. LUMBER COMPANY, ALBANY, GEORGIA

ALBANY, GEORGIA

"THE WORLD'S PECAN CENTER"

Come to Columbus

Where navigation meets power
at the falls of the Chattahoochee

THE farthest-South water-power development of magnitude offers here, in combination with favorable freight rates, a unique advantage to industries seeking Southeastern and export markets.

Columbus has a charming climate; it is a city of education, superb schools and happy homes—a good place for your family, as well as your factory.

Columbus is the home of Fort Benning, the greatest school of arms in the world.

COME TO COLUMBUS

A WELCOME AWAITS YOU

CHAMBER *of* COMMERCE
COLUMBUS, GEORGIA

Western North Carolina

WESTERN NORTH CAROLINA, centrally located with respect to the East, South and Middle West, is showing a remarkable growth in industry, business and agriculture. It possesses enormous water power, developed and undeveloped, has a variety of soils, an invigorating mild climate, a beautiful landscape and a population which is 99% native born American, only 8% of which is negro.

The climate, an abundance of native born labor, the softest water in the United States and its good transportation facilities to large markets as well as the availability of raw materials make many sections of Western North Carolina ideal for the location of various industries, particularly those using wood, clay, cotton and leather for their principal materials.

Western North Carolina is most favorably adapted to dairy and beef cattle raising and to the growing of apples and grapes.

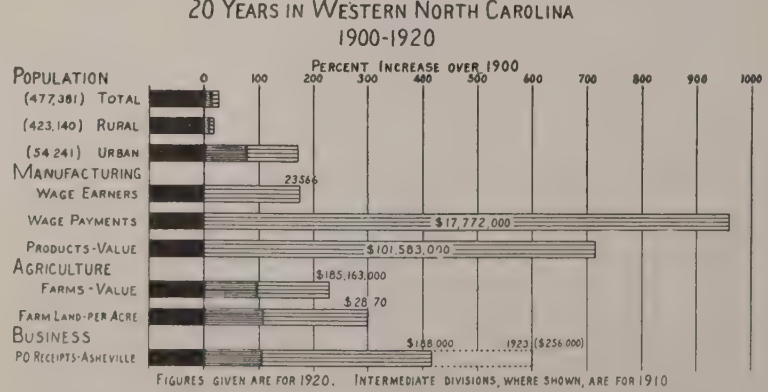
Iron ore, feldspar, talc, kaolin and mica are commercially mined.

In the past four years North Carolina has appropriated nearly $30,000,000 for schools, colleges and institutions. In addition to the amount spent by individual counties North Carolina is spending $65,000,000 for the building of a well planned system of state highways.

Western North Carolina is the playground of the East. Its resorts offer hotel and boarding house accommodations at prices to fit all purses.

Well regulated camps afford healthful, happy summers for thousands of boys and girls.

For information relative to natural resources, water power, industrial sites, agriculture, horticulture, convention facilities, resorts, hotels and boarding houses, boys' and girls' camps or any other information concerning this section write.

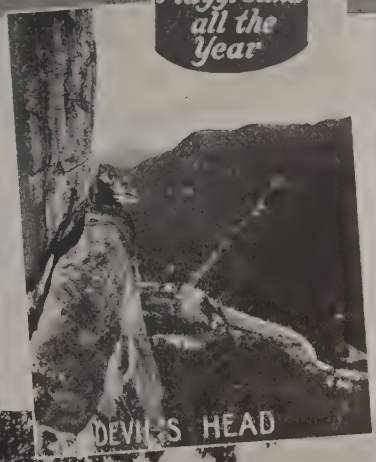


WESTERN NORTH CAROLINA, *Inc.* 6 GOVERNMENT STREET ASHEVILLE, NORTH CAROLINA

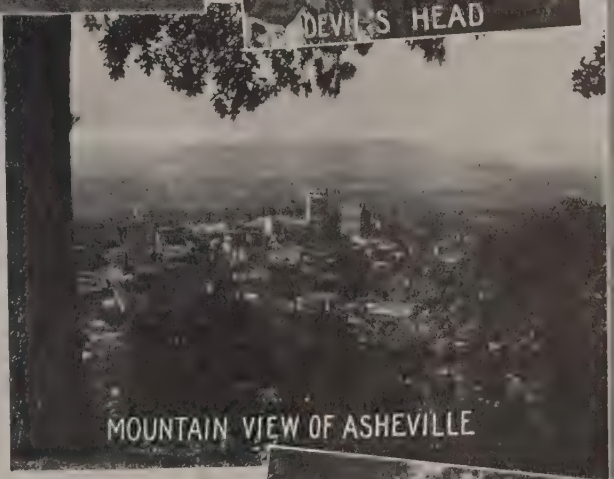
~ASHEVILLE~

America's Playground all the Year

RIDING TRAIL ALONG FRENCH BROAD RIVER

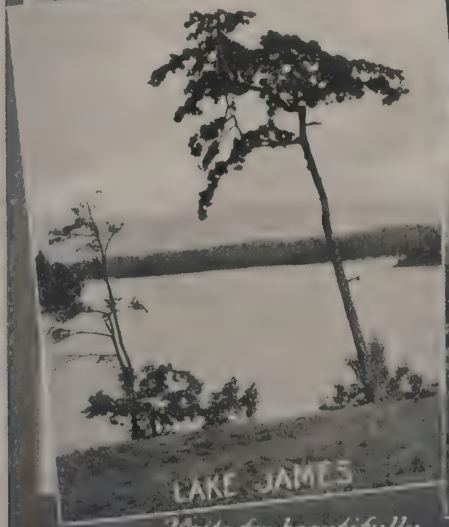

DEVIL'S HEAD

LOOKING GLASS FALLS


MOUNTAIN VIEW OF ASHEVILLE

BUFFALO

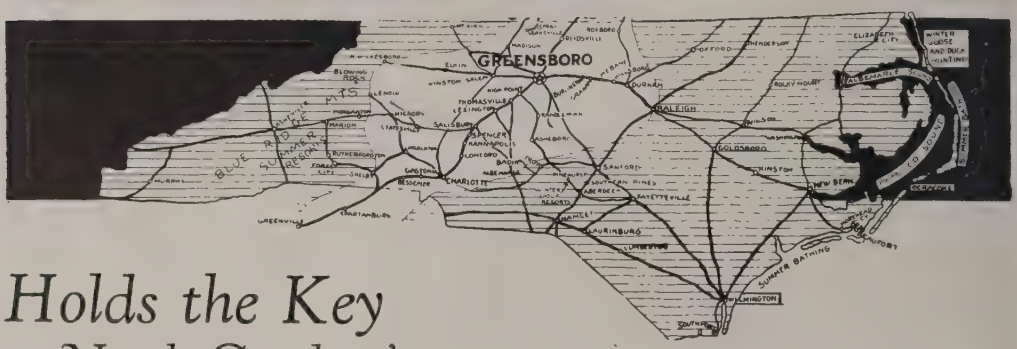
IN PISGAH NATIONAL PARK


LAKE JAMES

BILTMORE FOREST COUNTRY CLUB

Write for beautifully illustrated booklet "The Land of the Sky" addressing The Chamber of Commerce, ASHEVILLE, NORTH CAROLINA.

GREENSBORO



Holds the Key
to North Carolina's Wonder Industrial Zone

Analyze North Carolina, the fastest coming industrial section of the United States today, and you will find that her activities are centered in a zone along the Southern Railway, 50 to 150 miles wide, in which Greensboro is the best located city for shipping and business travel.

At Greensboro, rail routes and good roads converge from all directions, tapping a region of rich, diversified crops, of which this year's cotton and tobacco will pay the farmer about as big a year's profit as he has ever had.

Greensboro has ideal location—close to raw materials of farm, forest, mine and fishery—close to the markets—nearer to the center of population of the U. S. A., than Boston, New York, Buffalo, Philadelphia or Richmond—and is amply provided with banking facilities, hydro-electric power and native white labor—a splendid headquarters for manufacturing, wholesaling or sales division offices.

As for tributary territory—within 50 miles are 75 good manufacturing towns and 600,000 people; within 75 miles, enough big textile mills to spin 1,000,000 bales of cotton annually, one-tenth the entire 1923 United States crop. Greensboro, Winston-Salem and High Point form a close industrial triangle, including 323 factories, $126,000,000.00 capital, which in 1922 made goods worth $305,000,000.00.

Greensboro has business government, low taxation, progressive citizenship, practically no foreign population, 17 per cent good, useful colored folks; six colleges, fine public schools, hospitals, libraries, churches, hotels and clubs.

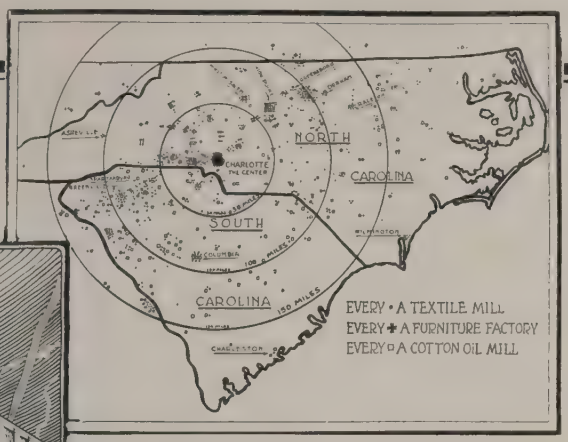
For men of Initiative, here is a City of Opportunity, a Place to Live, Serve and Prosper.

Place for Ideal Life

Owing to Greensboro's elevation, 843 feet, its climate has none of the summer languor of the Far South—none of the winter rigors of the North. Within a few hour's drive, over good roads, are famous winter resorts—Pinehurst, Southern Pines, etc.—and the equally famous summer resorts of the Blue Ridge mountains; choice of sea-bathing or mountain-climbing, wonderful hunting, golf or fishing.

Send for Facts

Write for fact-book entitled "Greensboro, Master Key of the South's Best Markets." Chamber of Commerce, 200 Jefferson Building, Greensboro, N. C.



Above—Wade Loft Building, Charlotte, N. C. Cost $200,000.00 and contains 96,000 square feet of floor space. Fireproof and modern in every respect and arranged for housing manufacturing industries.

When Henry Ford Chose CHARLOTTE, N. C.

He Voted with 570 Other Big Firms

FACTORIES, branch plants, warehouses or sales offices have been established at Charlotte, N. C., by 571 firms doing a national or inter-state business. The $2,000,000 Ford plant, a recent arrival, will supply the Ford dealers in both Carolinas and in parts of Virginia.

Charlotte is the logical headquarters for working both Carolinas—the hub of four railroads, radiating in eight directions—likewise, of a network of paved highways—the city that dominates the famous Piedmont Plateau, where centers the amazing industrial development of the South in the manufacturing of textiles, furniture and tobacco products.

Charlotte's leadership in banking and in power and transportation facilities in this region is unquestioned. There are rich opportunities in many lines, for the great expansion of trade and population has overtaxed the supply of business brains and energies.

Charlotte is a city of delightful climate, with a nine-months open season, of close to 70,000 population, the center of a remarkable trading territory. Over 1,000,000 people live within a 50-mile circle, that touches no other city of half its size.

How Charlotte Dominates

Banking—7 banks, with resources of $54,546,840; 1923 clearings, $431,398,302.22.

Transportation—4 railroads, 100 trains daily, modern highway system.

Power—Home of Southern Power Co., producing 600,000 horsepower.

Distributing Headquarters—571 firms doing an annual volume of $350,000,000.

Textile Headquarters—In vicinity 770 mills, operating 10,000,000 spindles. Twenty-eight textile mill presidents live in Charlotte.

FOR DETAILED INFORMATION
MAIL COUPON OR WRITE TO

CHAMBER *of* COMMERCE

CHARLOTTE NORTH CAROLINA

CHAMBER OF COMMERCE,
CHARLOTTE, N. C.

Send data. I am interested in (state line of business) _____

(Signed) _____

City _____ State _____

THE SOUTH'S RENAISSANCE

The re-awakening---the consciousness of obligations to be accomplished---the realization of the power to initiate and to do---then the determination---These prerequisites are the antecedents of the material evidences of progress.

CREATING LAKE LURE AT CHIMNEY ROCK, NORTH CAROLINA,
THE NUCLEUS OF A MOUNTAIN LAKE RESORT OF FIRST MAGNITUDE!

A great conception---an equally great assignment. The task, though, is of the sort that characterizes the New South---the South that has rediscovered itself and knows its power to do.

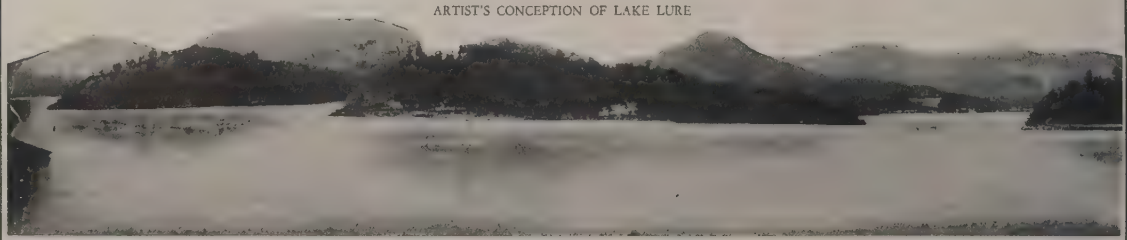
13 square miles have been purchased, backed by the incomparable Chimney Rock Mountains---Lake Lure will have an area of 1,500 acres and a shore line of 27 miles---and the dam will develop thirteen and a half million kilowatt hours of electricity a year---5,000 acres for subdivision purposes---every recreational requirement is being anticipated---a phenomenal climate and scenery strikingly like the Italian Tyrolean Alps---accessibility.

The project, though National in its scope, is the product of the Southland. It is being ably directed and financed by Southern people. Have you had a part in this development? *Send for literature.*

Chimney Rock Mountains, Inc.

ASHEVILLE, N. C. CHIMNEY ROCK, N. C.

ARTIST'S CONCEPTION OF LAKE LURE



The New Land of Opportunity

The Shenandoah Valley of Virginia and West Virginia

The Shenandoah Valley embraces the area lying between the Blue Ridge and Allegheny Mountains from Harpers Ferry, W. Va., on the north to beyond Lexington, Va., on the south. There are thirteen counties within this area. They are Jefferson and Berkeley in West Virginia and Clarke, Frederick, Warren, Page, Shenandoah, Rockingham, Augusta, Rockbridge, Bath, Allegheny and Highland in Virginia. Here are the cities and towns of Winchester, Martinsburg, Shepherdstown, Charles Town, Harpers Ferry, Berryville, Front Royal, Strasburg, Woodstock, New Market, Harrisonburg, Elkton, Luray, Staunton, Lexington, Waynesboro, Buena Vista, Monterey, Covington, Clifton Forge, Hot Springs. The Shenandoah Valley is 150 miles long and 25 miles wide.

The Shenandoah Valley Invites the Investor and Homeseeker

It is the Vale of Opportunity for Poultry Raising and Kindred Enterprises. Its thousands of acres of apple and peach orchards—the largest apple orchard in the East is located in the Winchester District—afford opportunities for Factories to Evaporate and Preserve Fruit. Its Blue Grass Fields—the best milk-producing food in the world—afford opportunities to develop Dairy Product Factories, such as Creameries, Cheese Factories, and Associated Industries. Its Diversified Farm Lands are capable of producing any product of agriculture that can be grown in the Northern temperate zone. Its Lands are "Acres of Diamonds" on account of their Limestone Deposits.

Its Mountain Forests furnish wood for Furniture Factories and Like Industries.

Its Rivers are capable of development of immense water power.

Its big Corn Crops invite Corn Products Factories.

Its Limestone lands produce the best bone and muscle in race-horses, there being no less than twelve stud farms in the Valley.

It is located at the door of populous cities, where its products can be marketed on short freight hauls and at low rates.

It possesses wonderful mineral deposits now awaiting the man with a vision of development.

The Shenandoah Valley has never had labor troubles. Its population is thrifty. Its climate is moderate in winter and summer. There is no excessive heat nor excessive cold.

It is today the MOST PROSPEROUS AGRICULTURAL SECTION OF AMERICA.

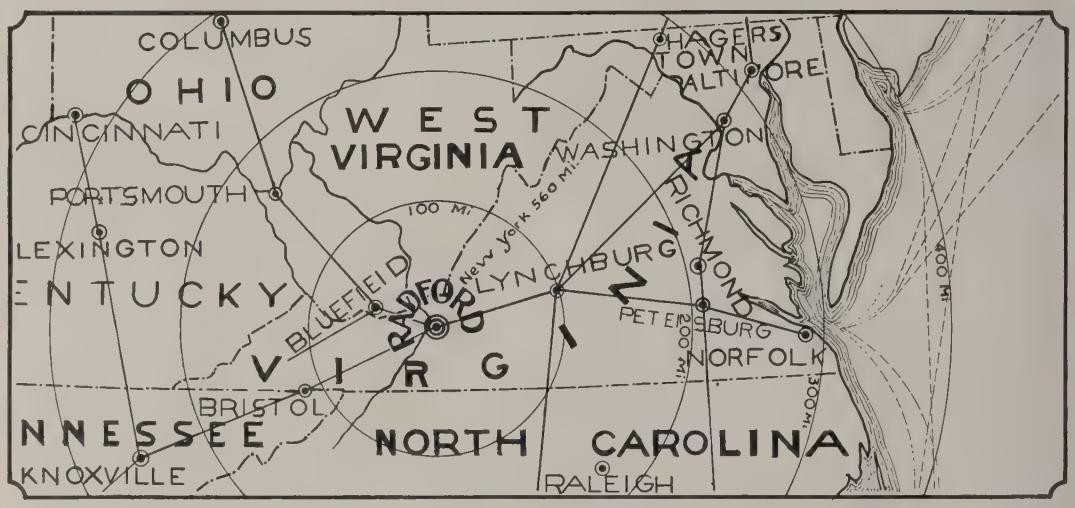
One of its great products is Baby Chicks, now sent to every state east of the Rocky Mountains.

If you are looking for a Home or a SAFE place to make an investment, write THE SHENANDOAH VALLEY, Inc., Harrisonburg, Va., or the Chambers of Commerce in any Valley town named above.

THE SHENANDOAH VALLEY—The Motor Highway between North and South

RADFORD, VIRGINIA

The Logical Location *for* Textile *and* Other Industries



RADFORD is a rapidly growing city of over 6000, in the heart of the beautiful Southwestern part of Virginia.

Radford is located on New River and the N. & W. Ry. and has splendid service to all important points. Radford is a terminal point on the N. & W. Railroad. Radford owns its electric, water and street railway systems. This territory is supplied with hydro-electric power in ample quantity, and with New River and the nearby coal fields of Virginia, West Virginia and Kentucky, the power question is fully solved.

Radford has a railroad trackage along the river of five miles which is especially desirable for factory sites.

Radford has the Creosoting Plant and the shops of the Norfolk & Western Railroad Co., The Lynchburg Foundry Company's Pipe Plant, John H. Heald & Co. Extract Plant, Paul Knitting Mills, Virginia Iron, Coal & Coke Company's Furnace, Radford Veneer Plant, Radford Ice Plant and others. The fact that these are successful concerns is evidence that they are properly located.

Other essential requirements, such as labor, climate, educational facilities, transportation, nearness to raw materials and a low tax rate, enables Radford to offer those establishing new mills a location that is ideal and of proven value.

Further and detailed information will be gladly furnished on request.

CITY MANAGER
RADFORD VIRGINIA

"A City With A Future"

ROANOKE VIRGINIA

ENTERPRISE, ENERGY and PROGRESS are the Important Factors

ROANOKE
A City with Splendid Industrial Opportunities

ROANOKE is making great Industrial Progress because of surrounding conditions and its superior location.

It has two Trunk Line Railways, affording ample connection East, West, North and South.

Close to the finest of coal fields, cotton and one of the greatest Seaports.

Direct connections with Washington, Baltimore, Philadelphia, New York, Boston, Chicago, points West and South.

ROANOKE has a supply of native-born labor, male and female. It is free from labor disturbances.

In fact
ROANOKE is an ideal location for manufacturing. We welcome an opportunity to furnish detailed information.

ROANOKE has adequate electric power at reasonable rates.

ROANOKE River, with its tributaries, offers a supply of water for manufacturing purposes.

ROANOKE'S climatic conditions are good.

Address
CHAMBER OF COMMERCE
ROANOKE, VIRGINIA

ELIZABETHTON—TENNESSEE

The City of Power

ELIZABETHTON, Tennessee, possesses the advantages of being an important junction point of the Southern Railway and the East Tennessee and Western North Carolina Railroad, connecting with lines in every direction which furnish splendid facilities for distribution, and offers distinct inducements to manufacturers.

Due to the fact that very soft water is obtainable in any quantity, Elizabethton offers ideal locations for industries, including textile mills and finishing plants. Cheap hydro-electric power is furnished by power lines of the Watauga Power Company. An abundant supply of efficient American labor is obtainable.

Accurate and Reliable Information Regarding the Opportunities Offered by Elizabethton May Be Secured from the

Elizabethton Chamber of Commerce

ELIZABETHTON——————————TENNESSEE

MORRISTOWN

The Gateway to Upper East Tennessee

Located on the main line of the Southern Railway; at the western terminus of the Southern's Carolina Division; at the crossing of the Buffalo Trail and the Memphis to Bristol Highway; in the center of a prosperous farming section and surrounded by numerous summer resorts.

MORRISTOWN HAS:

7500 population which is 99.9 per cent native born.
American; 80 per cent white, 20 per cent negroes.
Pure water, cheap power, paved streets.
A-1 high school and four ward schools.
Strong banks, churches and clubs.
Largest poultry market east of the Rocky Mountains.
Active mule market.
Burley tobacco market.
Large creamery.
Chain of canneries.
Furniture factories.
Thriving wholesale and retail business.

Morristown Wants: Textile Mills Garment Factories Brick Plant Foundry

Write MORRISTOWN CHAMBER OF COMMERCE, Morristown, Tenn.

Opportunities Amid Scenic Splendor

JOHNSON CITY, TENNESSEE

which led the South in percentage of growth and building in 1923, invites the most careful examination of its RESOURCES AND NATURAL ADVANTAGES FOR INDUSTRIAL EXPANSION

IN the midst of the Southern Appalachians, with an altitude of 1600 feet, with mild winters and pleasant summers, this community now has a population of 20,000, and less than one per cent are of foreign stock, providing plentiful white, loyal labor. Labor difficulties here are unheard of. We have cheap, abundant hydro-electric power, rich resources in minerals, including most of those mined in this country; great timber resources; good highways in every direction and three railroads, giving splendid transportation facilities to markets of the North, East, South and West.

TO the tourist and sportsman we offer a new playground. You may search the world in vain for more natural scenic beauty; near us are deep gorges, sparkling rivers and lofty mountains, their peaks towering upward toward an azure sky. In the Spring the mountains are adorned with a mass of rhododendron peeping from waxy green leaves, and on all sides the fragrant azalea and ferns give the effect of a huge corsage of pink and white, showered with the silver ribbons of the many mountain falls. The rivers have from time immemorial been the native home of the black bass, speckled and rainbow trout, which truly makes it a fisherman's paradise. While in the rugged fastnesses of the mountains, large game, including the black bear, makes interesting sport for the huntsman. Quail, pheasants, ruffled grouse and smaller birds are to be found in abundance. New visitors are usually amazed and always delighted.

¶ The business people of Johnson City are enterprising and work together, and newcomers will have their enthusiastic support and co-operation. We want new industries, especially textile, pulp, pottery and woodworking plants, although this community is, in the opinion of experts, an economic location for nearly every industry requiring intelligent American labor, favorable industrial conditions and inexpensive power. Write to

SERVICE DEPARTMENT, APPALACHIAN PUBLISHERS, INC.
or to the CHAMBER OF COMMERCE, JOHNSON CITY, TENN.

Correspondence regarding the opportunities here is invited

SWEETWATER, TENNESSEE

Offers

Unsurpassed opportunities and facilities for one or more Cotton Mills of large capacity, or similar industries

Ideal Factory Sites With Convenient Railroad Spur Tracks Available

UNLIMITED SUPPLY OF INTELLIGENT WHITE LABOR
NO STRIKES—NO LABOR TROUBLES

A clean, progressive little city of 3500 population, situated midway between Knoxville and Chattanooga, Tenn. In very center of textile industry of east Tennessee. Has paved streets, new public school buildings, good schools, good churches, enterprising civic organizations. A good place to live.

Officers of corporations considering a Southern location are invited to correspond with

JOHN M. JONES, *Chairman Industrial Development Committee*
SWEETWATER KIWANIS CLUB SWEETWATER, TENNESSEE

SOUTHERN POTTERIES, *Inc.*

ERWIN, TENNESSEE

Semi-Porcelain Dinnerware *and* Specialties

LOW FREIGHT RATES TO SOUTHERN POINTS

DEPARTMENT STORES AND JOBBERS ONLY

NEW YORK WOODWARD, BALDWIN & CO. BALTIMORE

SELLING AGENTS

Canvas Dryer Felts——BRANDON DUCK MILLS——Hose, Belting Sail Ducks
Towels and Crashes——GEORGIA - KINCAID MILLS——Red Diamond Birdseye
Outing Flannels——BROGON MILLS——Lad-Lassie and Romper Cloths
Sheetings, Drills, Print Cloths, etc.

WE SOLICIT CORRESPONDENCE

ERWIN, TENNESSEE

"The Pride of the Clinchfield Route"

ERWIN with a wide diversity of raw materials offers many advantages for manufacturing, particularly in textile, woodworking and pottery lines.

ERWIN HAS:

LABOR

In addition to the supply of labor in and around the City, there is available to Erwin a large supply of unusually good native white labor in adjoining mountainous counties where there is an absence of industrial plants to afford them employment;

POWER

There is available ample electric power from the Erwin Electric Light and Power Company and the Tennessee Eastern Electric Company, the latter a hydro-electric company with surplus power at this time and a contemplated development which can be made when needed that will practically double the present capacity. The best quality of steam coal is available at $3.15 per ton f. o. b. cars Erwin;

TRANSPORTATION

The City is served by the Carolina, Clinchfield and Ohio Railway reputed to be the best constructed railway in the South, running almost due north and south, crossing and connecting with such important systems as the Cheasapeake and Ohio, Norfolk and Western, Southern, Seaboard Air Line and Atlantic Coast Line affording quick and reliable transportation of both freight and passengers to all sections of the country. The famous Ashland-Asheville Highway, the hard surfacing of which should be completed in 1925, passes through the City affording connections with all important highways leading in all directions and is a part of the short route leading from the North and East to points in the Southeast;

RAW MATERIALS

There is available in the territory adjacent to the City a large variety of raw materials consisting of forest products of every description, both soft and hard woods. There are many varieties of minerals, the principal of which are Feldspar, Kaolin, Mica, Shales, Silica Sand, Limestone, etc., also Granite building stone, mined and manufactured into Pottery, Cement, Brick, Glass and other products.

Erwin in the heart of the Appalachian Forest Reserve has an altitude of 1683 feet. The climate is unsurpassed anywhere in this country and is enjoyable and healthful the year round. Erwin is supplied with the finest mountain spring water, and there is an abundant supply. The population exceeding 5000 is over 99 per cent white American stock. The shops and general offices of the Carolina, Clinchfield and Ohio Railway are located here as well as the large plant of Southern Potteries, Inc., manufacturers of the famous Clinchfield China. Three feldspar grinding plants and a silk mill are in successful operation. Erwin's monthly payroll is approximately $400,000.00. Educational and religious facilities are modern and adequate for expansion. A municipal auditorium costing $100,000.00 was recently completed. Erwin has a new modern hotel.

Manufacturers should investigate Erwin's resources and facilities for economic profitable industrial operation. Many desirable sites for industries free or at nominal prices.

New industries are assured of the cordial, enthusiastic support of our citizens.

For complete and accurate information write to

INDUSTRIAL COMMITTEE,
KIWANIS CLUB, ERWIN, TENNESSEE

(FOR TWO YEARS THE 100% CLUB)

HIGH POINT
NORTH CAROLINA
POPULATION 22,279

Where Busy Dollars Work and Earn

—the whole year 'round

INDUSTRY in High Point enjoys made-to-order conditions for enhancement and earning power of capital. Native American labor of high intelligence; 90 per cent home owners. Low living costs. Cheaper real estate for mill sites. Competitive railway service. An abundance of hydro-electric power and coal at encouragingly low cost. Nearby supplies of lumber and cotton. Ample banking resources.

Located on the main line of the Southern Railway 302 miles south of Washington and in the center of North Carolina's famous good roads section.

More than 125 factories now located in the city of High Point and thriving on these natural advantages. Furniture and textile manufacture are in the majority, yet through specializing on certain lines, even these fields are not nearly covered.

Capital seeking an industrial outlet or industry seeking distributing branches—see High Point. Get further facts bearing on your own particular problem. Address

CHAMBER *of* COMMERCE

HIGH POINT, N. C.

Manufacturing thrives best where there is an Agricultural Background

Montgomery

is in the heart of a rich farming section and adjacent to coal and iron region

LOCATED in the heart of a rapidly developing section. Six trunk lines of railway radiate north, east, south and west.

More than one-fourth million horsepower hydro-electric development is within 40 miles of this city. An additional one-quarter million is planned.

The white population is 96 per cent pure Anglo-Saxon.

No State income or inheritance taxes.

The State has a 50,000,000-dollar highway construction program. Good agricultural land from $25.00 to $100.00 per acre.

Excellent city schools, both public and private. Class A college for women. The county system of rural schools is recognized among the best.

Present population of the city, 52,000.

Free from radicalism and labor trouble. Ample skilled and common labor.

The citizenship is friendly to invested capital. Millions of dollars each year are sent to other sections for manufactured goods which will eventually be kept at home.

Your thorough investigation is invited.

CHAMBER *of* COMMERCE

MONTGOMERY, ALABAMA

SOUTHERN CITIES SEEKING INDUSTRIES

DEFINITE information about industrial and business opportunities in their respective communities will be gladly furnished by the following Southern business organizations

BESSEMER, ALABAMA

"THE MARVEL CITY"

Destined to be the greatest industrial center of North America and the second largest city in the state. The natural iron and steel producing center; hence, cheaper production in finished products. A detailed survey will be submitted upon request. Our Industrial Engineering Department places us in position to advise intelligently.

BESSEMER CHAMBER OF COMMERCE, INC.

BATON ROUGE, LOUISIANA

The Capital of the State

Population, immediate suburbs, 42,000. Excellent Educational Advantages. Six Trunk Lines of Railroads. Deep Water Transportation. Dock and Terminal Facilities. Attractive Power and Freight Rates. Fine Industrial Sites. Especially adapted for Furniture, Textile, Steel, Concrete, Chemical and Veneering Plants.

Baton Rouge Chamber *of* Commerce

TUSCALOOSA, ALABAMA

——TEXTILE MANUFACTURES——

We offer you Free Site and Will Construct for Your Industry a Modern Building

Address Chamber *of* Commerce

NEW ORLEANS

Financial, Industrial and Commercial Center of the South

NATURAL SEAPORT OF THE MISSISSIPPI VALLEY

——WRITE INDUSTRIAL BUREAU——

NEW ORLEANS ASSOCIATION OF COMMERCE, FOR INFORMATION

BLYTHEVILLE, ARKANSAS

"KING COTTON'S CAPITOL"

Population, 1923—10,011 people. Four Railroads, 9 Cotton Gins, 2 Cotton Compresses, Cotton Oil Mill, 150,000-Bale Cotton Market, Ample Native White Labor, Largest Cotton Ginning City.

COTTON MILLS INVITED TO INVESTIGATE ADVANTAGES

BLYTHEVILLE CHAMBER OF COMMERCE

SINCE 1900 Laurel has grown in population from 3,000 to 16,000. An abundant supply of raw material, water, cheap power, and native white labor combined with other advantages make it an attractive industrial center. Those looking for locations for furniture factories, pulp and paper mills, or cotton mills would do well to investigate Laurel's advantages. Address

CHAMBER OF COMMERCE, LAUREL, MISS.

FORT SMITH

CHEAP FUEL AND POWER

600,000,000 Cubic Feet Natural Gas Daily Flow.
Four Billion Tons of Coal within 100 Miles.

For full information write

CHAMBER OF COMMERCE

FORT SMITH ARKANSAS

BLACK MOUNTAIN

Western North Carolina's town of opportunity. Elevation, 2400 feet. Average temperature, 55°. Yearly rainfall, 54 inches. Southern Railway Station for Mt. Mitchell. Ideal location for either homes or industrial plants. Electric power. Native labor. We invite inspection, or for detailed information write

CHAMBER OF COMMERCE

THE GATEWAY TO THE SCENIC HIGHLANDS

HAINES CITY, FLORIDA

THE BEST INVESTMENT

REX SAFFER, *Sec'y*
Box A13

FOR INFORMATION WRITE
CHAMBER OF COMMERCE

HENDERSON, NORTH CAROLINA

The City of Diversified Industries

Industrial Survey recently completed shows ideal conditions for new industries. Information given promptly. "Rock Bottom" facts compiled by Industrial Engineers given you.

HENDERSON CHAMBER *of* COMMERCE, *Inc.*

LEESBURG

THE AMERICAN CITY
In the Lake-Girt Hills of

FLORIDA

EASTERN NORTH CAROLINA

"WHERE PROSPERITY IS PERENNIAL"

Invites You. Write

EASTERN CAROLINA CHAMBER *of* COMMERCE, *Inc.*

KINSTON
NORTH CAROLINA

BLACKWELL, OKLAHOMA

Population 10,500; industries of all kinds wanted; unlimited supply of natural gas of best quality. Excellent shipping facilities; cheap labor; low taxes; good schools, churches and lodges. In the center of the largest oil and gas producing fields of the state. Annual payroll, $1,500,000.00.

Address, CHAMBER OF COMMERCE

ROCK HILL

SOUTH CAROLINA'S GOOD TOWN

For further information address

CHAMBER OF COMMERCE

OKLAHOMA CITY, OKLAHOMA.

GEOGRAPHICAL, political, educational, financial, manufacturing and distributing center of Oklahoma. Population 125,000. Five trunk line railroads. Hub of interurban system. Immediate trade territory with population of 500,000. Inquiries answered promptly and intelligently.

CHAMBER OF COMMERCE.

SHREVEPORT, LOUISIANA

"The Ideal City"

Offers to industries a varied supply of raw materials, and complete advantages for economical and successful manufacture.

For detailed information address

Chamber of Commerce - Shreveport, La.

SUBDIVISIONS, ACREAGE AND BUSINESS PROPERTIES

In and Around

CLEARWATER, FLORIDA

$1,000,000 Now Being Expended on Causeway to Beach

Donald Alvord REAL ESTATE

CLEARWATER FLORIDA

Build your factory in BIRMINGHAM

BUILT ON SERVICE

—Where labor is plentiful, distribution facilities favorable, power abundant and cheap!

Good Sites—Well Located may be obtained through this company. A close association for more than 21 years with Birmingham's progress enables us to render dependable service.

JEMISON & COMPANY

REAL ESTATE SALES, LOANS, INVESTMENTS

BIRMINGHAM, ALABAMA

"The Town Progressive."

Williamston North Carolina

SURROUNDED and backed up by the most populous and fertile agricultural Counties in the South.

Good hard-surfaced roads leading out of here to all points. Good schools and churches.

Situate on Railroad and navigable waters of the historical Roanoke River.

The climate is pleasant the year around.

Plenty of labor.

The best location for factories, of any kind, in the South.

We invite correspondence from manufacturers or any interested parties inquiring of the possibilities of the South.

We cheerfully answer inquiries of tourists regarding highways, etc., *address*

HUGH G. HORTON, *Secretary*

CHAMBER *of* COMMERCE

WILLIAMSTON, NORTH CAROLINA

BESSEMER COAL, IRON and LAND COMPANY

BUILDING LOTS

MANUFACTURING SITES

At BESSEMER, ALA.

For further information write

Bessemer Coal, Iron and Land Co.

1312 AMERICAN TRUST BUILDING

BIRMINGHAM ALABAMA

YOU'LL WANT TO LIVE IN

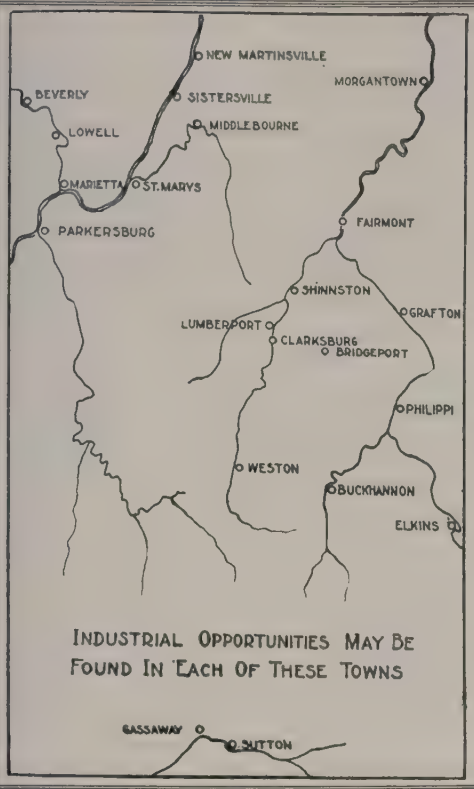
Clearwater, Florida

THE MATCHLESS GULF, THE BLUE-GREEN WATER, THE CORAL REEFS, THE TROPICAL KEYS—ALL HAVE AN IRRESISTABLE APPEAL

WYATT & PARKER

REAL ESTATE

Offices 14-16 Scranton Arcade, Clearwater, Fla.



INDUSTRIAL OPPORTUNITIES MAY BE FOUND IN EACH OF THESE TOWNS

Available Industrial Sites

Are to be found in the Upper Monongahela Valley and in West Virginia and Eastern Ohio in the Ohio Valley. These are very attractive for the reason that they enjoy adequate, constant and very cheap Electrical Power and cheap Fuel furnished by the Coal mines of the Fairmont District in which the various cities and towns are located or closely adjacent.

Inquiries addressed to the Chambers of Commerce of Cities on our System, or to us, will be cheerfully and promptly answered.

Our staff of Industrial and Power Engineers is at the service of those who seek factory sites in our Field.

The
Monongahela West Penn Public Service Company
FAIRMONT, WEST VIRGINIA
EARL B. SMITH, *Commercial Manager*

TAMPA
And All South Florida

We have watched its phenomenal growth for years. We know values, and have responsible correspondents in all growing towns in this section. We will be pleased to furnish information, and especially invite the correspondence of reliable brokers in the principal Northern cities who desire Florida correspondents.

CONOLEY-FROST, *Inc.*
TAMPA FLORIDA

WINTER *versus* SUMMER VACATIONS

Science Proves Winter Holiday More Curative and Conducive to Longevity

YOU—Mr. Man from the North States.

YOU—who struggle valiantly but ineffectually against the RIGORS of New England's Winter, and other states where frigid winds howl and blizzards rage—snow, ice, zero weather.

YOU—who exist all winter in closed houses and transact your affairs in heated buildings, breathing, in home and office, devitalizing and poisonous air.

YOU—who SMOTHER the skin (the millions of air cells whose function is to eliminate poisons and inhale oxygen) with woolen underclothing and heavy outer garments.

YOU—who, because of climatic conditions in which you live during the WINTER in the NORTH are developing serious bodily disorders and thus cutting off just ONE-THIRD of your life.

YOU—Mr. Man, need in the WINTER, AT LEAST, A MONTH of pure air for twenty-four hours a day—every day. OZONE reaching every part of your skin and filling your lungs to their utmost capacity many times during each day.

YOU—Should know that in the NORTH your HOSPITALS are full every WINTER and the reason—AS STATED ABOVE.

YOU—MR. MAN OF AFFAIRS, should know this undisputed, pertinent fact, that unless you RECREATE in WINTER under IDEAL CONDITIONS you are going to lose vitality, health, ability, efficiency, keenness, and many YEARS OF YOUR LIFE.

COME AWAY, COME AWAY, FOR A WINTER HOLIDAY and

forget for a time cares and bathe in AIR and OCEAN constantly, hour after hour, until energy flows to finger tips and the brain responds like a flash to the will.

And then, YOU, MR. MAN, can return to home and business "renewed like the eagle." BRAIN, HEART, WILL and BODY functioning perfectly and co-ordinating magnificently.

IT IS NOT THE SUMMER when you need a vacation, traditions and customs notwithstanding. In summer you have golf, tennis, open air motoring, windows open, light clothing.

But WINTER, when the human machine is clogged with CARBON—that is just what it is CARBON—which cannot be removed under severe weather conditions.

But a word to the wise, etc.

John D. Rockefeller (if you should visit Daytona and go up to Ormond links where the richest man in the world plays golf every morning) will tell you, if you seem at all responsive to the beauties and physical and mental benefits of this part of America, while he puts his hand on your shoulder, "Son you need travel no further, this is EARTH'S PARADISE."

RIO VISTA, on the Halifax, between beautiful Daytona and exclusive Ormond, is the DREAM COME TRUE of one man, Walter C. Hardesty. He lives there in a magnificent estate of Spanish-Moorish architecture.

RIO VISTA IS WAFTED BY cool river and ocean breezes. Easy distance from the twenty-seven mile drive on the beach 500 feet wide, longer and wider than any beach in America or Europe. The roar of the breakers as you idle or speed along over the velvet smoothness of the finest road for autos on God's green earth; the wide expanse of ocean that greets your eye; the breath of salt from the sea; the sub-tropical shore; the unparalled sunshine and climate cause you to exclaim, "How wondrously beautiful and delightful."

SEE RIO VISTA FOR YOURSELF, RIO VISTA THE BEAUTIFUL! RIO VISTA THE HEALTHFUL! RIO VISTA THE IDEAL FOR THE WINTER VACATION! Where river and ocean, flowers and tropical plants, purest drinking water in Florida; canoeing, boating, golf, tennis, trap shooting, horseback riding, open air living, delightful climate, to say nothing of plucking oranges, grapefruit and other luscious fruit with your own hands from the trees, but the STORY CANNOT BE HALF TOLD—YOU, MR. MAN, FROM THE NORTH COUNTRY, should finish it.

Wise you are if you come to RIO VISTA, the most DELIGHTFULLY BEAUTIFUL, IDEALISTICALLY SITUATED WINTER RESORT—NOT ONLY IN ALL FLORIDA BUT ALL AMERICA AND PERHAPS IN THE WORLD.

More Information at Rio Vista Office, Daytona, Florida

The Different Villages at Daytona Highlands

ONE of the most distinctive features of the Daytona Highlands plan of development is the choice given the prospective builder in the type of architecture to be used.

Many prefer the so-called Mediterranean style of dwelling. In fact, there is a growing tendency on the part of people building in Florida to adopt this general type. For this reason, and because this is peculiarly adapted to this climate, a large section of the Highlands tract has been restricted to the use of this school. There are many, however, who, owing to personal tastes and inclination, prefer to use, perhaps, the English country house as a basis for designing their homes. For the accommodation of such people Daytona Highlands is exceptionally fortunate. The hills and valleys on the property, so plentiful and so beautifully wooded, overlooking lakes and glens of matchless beauty, are splendidly adaptable to the erection of homes of this type. The general layout is such that the lines of demarcation so separate the various sections that any clashing of types, any lack of perfect harmony, are entirely avoided.

You simply drive or walk out of a beautiful Spanish village, perfect in every detail, with its towers, its domes, its bizarre little minarets, through this glen into an equally beautiful and enchanting little English village, as distinctive in its own peculiar setting as the Spanish village just left behind. Through this strip of woods and across this little canal you come upon a quaint Dutch section, with its low-roofed cottages, its tiled areaways, and its long leaded glass windows. Even a tiny windmill may be visible through the pines. For the moment you are in a corner of old Amsterdam.

Again, around this corner, you come upon a village of Japanese homes, surrounded by Japanese gardens, miniature lakes, high-arched rustic little bridges, abounding in lotus and wisteria. For there are many builders these days whose hobby is the Japanese garden.

Try and imagine, for a moment, the net result of all this as time goes on. Your neighbors will be people whose tastes and interests harmonize with yours, whose ideas in the matter of building and landscaping coincide with your own. This greater harmony in landscaping and architectural setting must, perforce, make for a greater congeniality among the various residents in such a community.

General Information

TO say that once you have seen a part of Florida you have seen it all would be like saying that once you have seen Paris you have seen Europe. Nothing could be farther from the truth. There are, to be sure, no mountain ranges in Florida, 'though there are hills, real hills, hills that get you out of breath to climb, little more than a block beyond the city limits of Daytona and less than three miles from the ocean at Daytona Beach. But there are no mountain ranges. Aside from this fact it is quite safe to say that Florida is as varied in its offerings, perhaps more varied, than any other State in the Union.

Daytona Highlands, one of the three largest and most highly restricted developments in the State, is as different from any other as Florida is different from its sister States farther north. People are wont to think of Florida as being entirely flat with nothing to break the sameness of level country. This is true of most sections of the East Coast, as well as of the West Coast. Daytona Highlands is peculiarly fortunate in three outstanding respects: First, it is situated but one block west of Daytona, a thriving city of magnificent homes, palatial hotels and fashionable shops. It is but a short ten minutes' drive to the World's Champion Ocean Beach. Second, it is almost entirely composed of ranges of hills, making the most wonderful homesites that man could possibly desire. Third, it has a chain of seven tropical lakes of unsurpassed beauty and charm, ranging in length from half a mile to a mile or more, fed by springs of pure water, abounding in excellent fish, free from mosquitoes and safe for children, due to the fact that the maximum depth is little over four and a half feet. These lakes are overlooked by the hills that surround them on all sides, providing the most enchanting of tropical vistas in every direction.

A superb golf course, to be one of the finest in the South, is now under construction by a noted golf architect and collaborator with the famous Donald Ross. The course is so situated as to be easily accessible from all parts of the suburb.

While there is little to be said against the summer climate in almost any section of the State, still it is true that Daytona Highlands is more than extraordinarily fortunate in this respect. Altitude is in part responsible for this as are the lakes, themselves some thirty or more feet above the sea level. Add to this the fact that a broad strip of hardwood timber, with its deep green, heat-absorbing foliage, stands to the east of Daytona Highlands, having a cooling effect on the already cool trade winds wafted in from the ocean. Peculiar as it may seem, during the winter months it will be found a few degrees warmer in many parts of the Highland Suburb than nearer the ocean, perhaps due to the wealth of southern and western exposure possible among the hills.

The Daytona Highlands Company is operating free bus lines from various other points in the State to Daytona, using the finest type of Pullman Bus for the purpose. This makes it possible to leave the train at Jacksonville, for instance, and make the 100-mile trip to Daytona in utmost comfort and over the most magnificent scenic route.

Space will not permit a more adequate description of this unique recreational and scenic development. But if you are coming to Florida do not miss an opportunity to see Daytona Highlands. You will find it a standard by which to judge all other residential projects in the State.

DAYTONA HIGHLANDS COMPANY

OWNER

THE TRAYLORS OF DAYTONA

Florida Sales Representatives, with Headquarters at DAYTONA, FLORIDA

100,000 ACRES For Sale

In tracts of forty acres up, ditched, ready for farming. Larger tracts for development and colonization

Sugar cane produces heavily and makes excellent stock feed as well as sugar and syrup. The sucrose content is high.

IN THE sub-tropics, 35 miles west of Palm Beach and 45 miles north of Miami.

On the route of the Cross-State Motor Road between Palm Beach and Fort Myers, connecting the Atlantic Ocean and the Gulf of Mexico.

When the north is in Winter's grip, and appetite and health call for the vitamine - containing green vegetables, this region, favored by climate, is shipping the most profitable crops grown on American farms. It is not unusual for truckers to clear $1000 on a single acre in one season. Production costs are exceptionally low.

Many varieties of grasses are grown here. Green pastures 365 days each year insure the success of stock raising. No expensive barns, silos or outbuildings necessary.

Growing potatoes on our lands. Growing winter vegetables for Northern markets is highly profitable.

A LARGER range of staple crops can be grown in this region than anywhere else in the United States. With the crops and fruits that are grown here every need of the family for home-grown foodstuffs is supplied.

Flowers the year round make homes cheerful; outdoor life makes people healthy; the crops and prices make them wealthy. Why not live and work in a climate where "God's Great Out-of-Doors" basks in Eternal Sunshine and where you may produce growing crops 365 days in the year with unusual profits accordingly?

Prices Range from $75.00 per acre up

WHOLESALE PRICES ON APPLICATION

Richly Fertile Florida Lands

At the south end of Lake Okeechobee. On the route of the Miami-Okeechobee Extension of the Florida East Coast Railroad

THE soil is rich muck (no fertilizer required) with a soft marl sub-soil which fixes a definite water table for the maintenance of adequate moisture at all seasons.

The growing season extends from one end of the year to the other, four crops a year on the same land being possible. Crops grow quickly in muck soils.

Dairying and poultry raising are very profitable. All feed required can be grown on the lands, the livestock may graze on green pastures 365 days each year, and the closely adjacent Tourist Resort Cities make a highly profitable demand for these products.

Corn here yields above the Northern States average.

A branch of the Florida Agricultural College is located within the area of these lands. The United States Government maintains a cane testing station a short distance away.

Farmers: Why not farm in Palm Beach county, Florida; in the climate where millionaires pay to play? You will add years to your life by living and working in the Florida Climate, away from the trying winters of the Frozen North.

LARGE PROFITS
EASY WORK
LET US EXPLAIN

For full information fill out and mail Coupon to

JEFFRIES SCULLEN & WERNER,
501 First National Bank Building,
Miami, Florida

Please send me, without obligation, full information on Florida Lands.

I am interested in land for:

Farming ☐ Colonization ☐ Investment ☐

At present engaged in.....

I can invest up to $.....

Desire pay cash ☐ Terms ☐

Name .....

Street .....

City..... *State*

JEFFRIES, SCULLEN & WERNER

SUITE 501, FIRST NATIONAL BANK BUILDING MIAMI, FLORIDA

Inlet Terrace

"Where the Ocean and River meet"

LOCATED TEN MILES SOUTH OF DAYTONA, FLORIDA'S IDEAL HOME CITY, LIES BEAUTIFUL INLET TERRACE. BATHED IN THE TEMPERED BREEZES OF THE ATLANTIC OCEAN AND HALIFAX RIVER, INLET TERRACE OFFERS YOU AN IDEAL LOCATION TO ESTABLISH YOUR WINTER HOME.

Florida Coast
OWNERS AND
Atlanta Block

FLORIDA'S
SUPREME DEVELOPMENT
ON THE WORLD-FAMED
ORMOND-DAYTONA BEACH

BEAUTIFUL OCEAN FRONT ESTATES, PICTURESQUE RIVER VIEW LOTS, WINDING DRIVES, THE HOTEL INLET TERRACE, THE FINEST HOSTELRY ON THE EAST COAST, GO TO MAKE THIS GREAT DEVELOPMENT

THE SUPREME HOMESITE OF THE WORLD

INSURE YOUR FUTURE HAPPINESS BY CREATING YOUR HOME AT INLET TERRACE

DAYTONA'S EXCLUSIVE SUBURBAN COLONY

Investment Co.
DEVELOPERS
Daytona, Florida

BELIEVING there is room for another organization of service—conscientious—of unquestioned integrity—of wide experience in the real estate field—we offer our services to the public interested in

FLORIDA

To Buy or Sell
To Appraise
To Subdivide
To Handle Development Projects

IF INTERESTED IN FLORIDA—
ITS LAND OR OPPORTUNITIES
WRITE US

THE G-W CO., INC., *Realtors*

GORDON WARE, *President*

207 S. Olive Street WEST PALM BEACH, FLA.

A Florida Opportunity

ONE Hundred Twenty Thousand Acres of Land, forty miles from Jacksonville, the gateway and metropolis of Florida. With hard-surface road to heart of tract; sixty-five thousand acres under fence; ten to twelve thousand under cultivation; fifteen miles of railroad, with freight and passenger equipment; two hundred buildings; five hundred acres in pecans — five dollars per acre. Conservatively worth six times this. No state income or inheritance tax. Don't wire unless you have $600,000 cash.

IF INTERESTED IN FLORIDA—
ITS LAND OR OPPORTUNITIES
WRITE US

THE G-W CO., INC., *Realtors*

GORDON WARE, *President*

207 S. Olive Street WEST PALM BEACH, FLORIDA

Palma Sola Park

"The Finest Suburb on the West Coast"

Overlooking the Blue Waters of Palma Sola Bay
Three miles West of Bradenton—Twelve miles North of Sarasota
Forty-two miles South of Tampa

PALMA SOLA PARK is not a suburb isolated from any city—seventeen thousand people live in Bradenton and its immediate vicinity—the most talked-about section of Florida, the wonderful Manatee region. ¶ Perfect roads, numerous bays and rivers and the great Gulf of Mexico; fishing grounds surpassed by none, three golf courses, tennis, boating, surf bathing—a land of sunshine and balmy breezes, with the marvelous climate which gives to Bradenton, Sarasota and Manatee county all the delights of summer while freezing winter grips the North. ¶ Palma Sola Park, fully developed and highly restricted, was placed on the market in September and the first and larger unit is now sold out, with a number of beautiful Spanish-Moorish homes nearing completion. The second unit, which is the last unit, will be offered for sale during December.

Wyman & Green, for the past fifteen years, have conducted a general real estate business in Bradenton and Manatee county.

Shrewd investors and developers, in increasing numbers, are buying and selling through our office because our values are sound

Edwin C. Barnes & Company, Owners

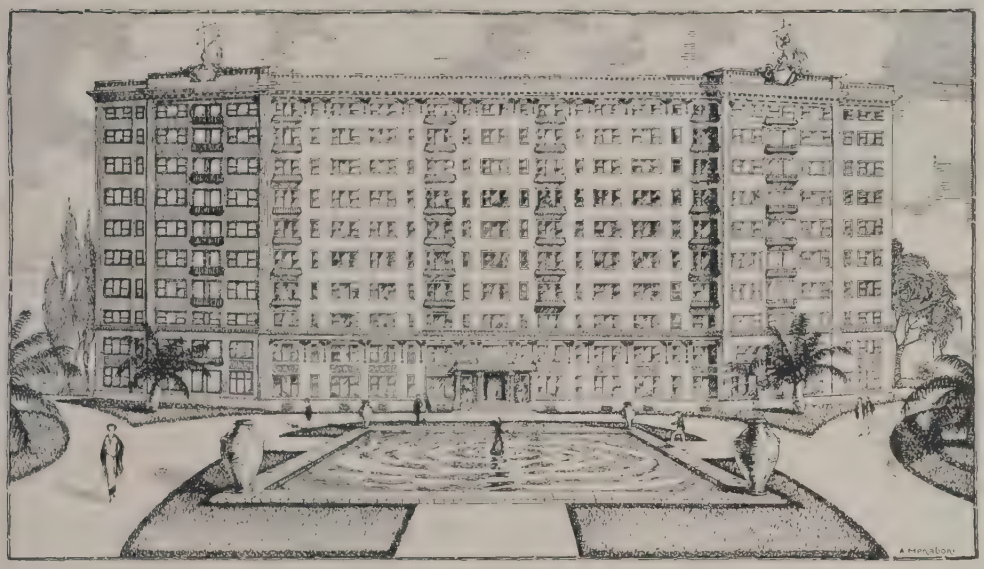
WYMAN & GREEN

MANAGERS AND SALES AGENTS

Bradenton ~ Florida

Corner Broad St. and Manatee Ave ~ Phones 43 & 280

This Palatial New Apartment House
To Be Tampa's Biggest



—ON—

DAVIS ISLANDS
TAMPA IN THE BAY

The South's Greatest Development

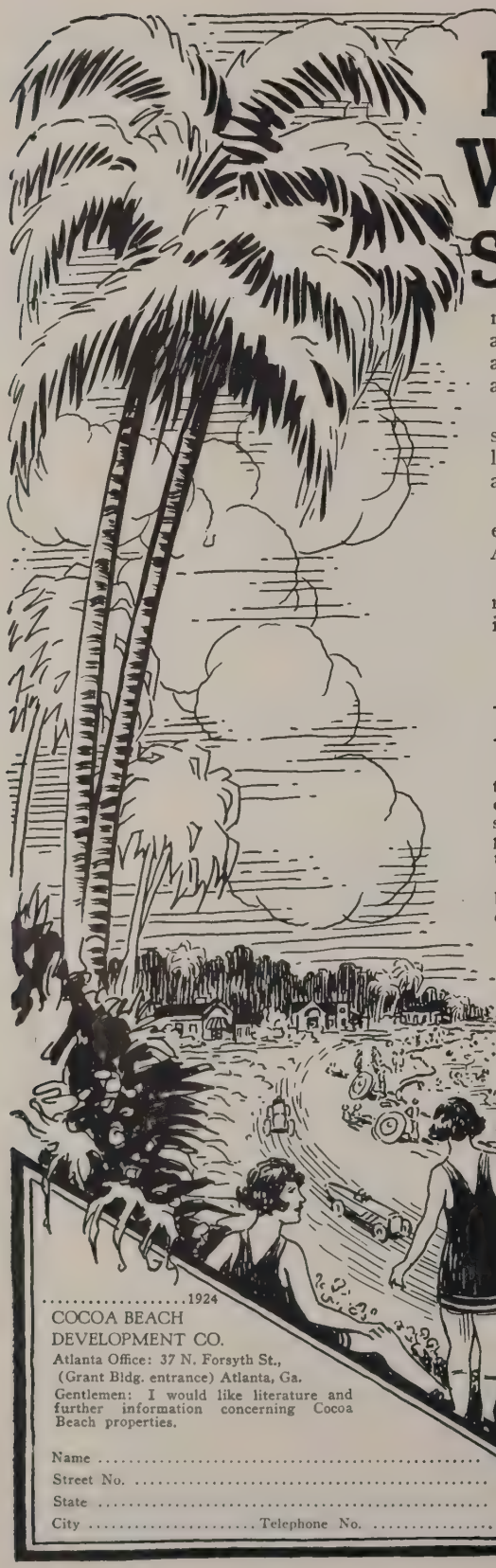
WHERE $30,000,000 is being spent to produce a glorious setting for America's finest homes—with sports and every sort of absorbing recreation; where the early stages of development present a source of large earnings for investors; where nearly $3,000,000 worth of property was purchased in ten hours. This is Davis Islands—Tampa—the most interesting spot in Florida!

Send for Booklet—"Tampa's Unqualified Endorsement"

D. P. DAVIS PROPERTIES

208 MADISON STREET

Tampa Florida



Breezes of Florida Whisper Investment

SOOTHING breezes whispering in the palms of Florida are calling to the primeval heart of humanity. There is ever-existing charm in the tantalizing haze of the Indian River, resting over this veritable dreamland like a veil of gossamer; and the balm of the azure sky which clothes the landscape with a nameless enchantment and enriches the soul of him who approaches it with sympathetic understanding.

A pleasureful trip through this famous Indian River country-side with its gorgeous sunsets, moon-bathed nights, and sparkling, sun-lit waters—brings realization that Nature's gifted artist has attained the summit of beautiful achievement.

The world-renowned Cocoa Beach offers fourteen miles of excellent driving surface, lapped by the warm waters of the Atlantic which permit bathing almost all-year-round.

The voice of the Suniland—"The Land that Loves A Playmate"—calls to you smiling, beckoning, inviting you to bask in its luxuriant glory.

Cocoa Beach Offers Florida's Greatest Advantages

Florida as an investment is an absolutely known quantity. Florida's tax records show the best financial investors in the country have acknowledged acceptance of this fact by investing in Florida. Babson's statistics show that the bank clearings of the entire United States during the past four years increased about 15 per cent, while in four Florida cities the increase during this period was over 500 per cent.

Cocoa Beach is located right in the heart of Florida and it takes but a casual glance at its advantages to show its superiority. The climate and health conditions here are the best—entertainment facilities are adequate. As a playground for all it is without equal. For investment, Cocoa Beach stands out in the front like a beacon.

Home-seekers and investors can buy a lot on Cocoa Beach now at prices from $1,000 up, with reasonable terms on the purchase. This will not be the case later.

If you desire an investment that will undoubtedly pay you big dividends, then investigate Cocoa Beach and its possibilities. The liberality of Florida's tax laws is an outstanding added invitation to invest in Florida.

COCOA BEACH, FLORIDA

GUS C. EDWARDS, *Owner & Developer* — 37 N. FORSYTH ST., *Atlanta, Ga.*

.....1924

COCOA BEACH DEVELOPMENT CO.

Atlanta Office: 37 N. Forsyth St., (Grant Bldg. entrance) Atlanta, Ga.

Gentlemen: I would like literature and further information concerning Cocoa Beach properties.

Name .....

Street No. .....

State .....

City ..... Telephone No. .....

BRASWELL REALTY COMPANY

Well, well, you can tell
From this map of Braswell's
That this is the city in which to dwell.
Your friends and investors as well
Who would see their funds grow and swell
Till they reach—well, well,
You never can tell—unless you ask Braswell.

Fort Pierce is reached by all the trails,
Whether it be air, motor, rail or sails,
From the North, East, South or West;
This is why our location is best.
If you give our city the proper test
You will find it leads all the rest—
Then you will invest.

A few of the reasons we suggest
Why you should investigate, then invest:

$10,000,000 *for* CAUSEWAY, PORT, HIGHWAYS, DRAINAGE
DOUBLE-TRACKING OF RAILWAY, SCHOOLS, CHURCHES

Best Citrus Country in the World. Finest Trucking Soil in the South
Best and Most Complete Drainage System in Florida
Most Favored Section for Climate, Finest Bathing Beach on East Coast

We are

GENERAL REAL ESTATE BROKERS

Ocean and River Frontage, Groves and Truck Farms, City Property, Colonization, Ranch and Timber Lands

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Braswell Realty Company

FORT PIERCE, FLORIDA *Correspondence Promptly Answered*

We are doing things in Florida these days. Folks are actually buying property by wire. Think of it! What have you bought here?

We Have the Best of Everything in

FLORIDA

Houses for sale. Rentals by the season as low as $700.00, and as high as $15,000.00.

Palm Beach and West Palm Beach should be known as one place; both very active, only a short bridge between.

Come in to see us—or write us.

We can show you property that will make a very large per cent for any money invested.

What care we for rain or shine,
So long as ocean front is yours and mine.

See Dixie and Okeechobee.
See my Stewart Development.

Friends of Richmond and Baltimore should read this advertisement, then buy a great deal more.

How about it?

L. E. BRIGGS

SERVICE IN REAL ESTATE

108 South Olive St. West Palm Beach, FLORIDA

An Investment in Beauty With Assurance of Profit

EVERY winter Florida entertains hundreds of thousands of visitors, who come here looking for health, sunshine winter pleasure and tropical beauty. That they receive 100 per cent on their investment is proved by the fact that they come back again and again for enjoyment, and not a few of them become permanent residents of the state.

Florida is big enough and great enough for all. The tropical beauty which appears in such overflowing abundance is only one of its many attractive phases. Certainly no state in the Union holds such unlimited opportunity for profitable investment as Florida does today. Coral Gables, Florida's greatest and most beautiful suburb, is a notable example of American landscaping. The visitor who sees it cannot fail to appreciate its surpassing beauty. And the more he sees of Coral Gables the more apparent will be the opportunities which are here present for investment.

More than $15,000,000 worth of property in Coral Gables has already been sold. More than that amount has been put into construction, beautifying improvements and utilities which make for rapid increases in value. That is what makes Coral Gables property so safe and desirable, as well as profitable for the investor.

Booklets, maps and descriptive literature of many kinds may be had for the asking.

CORAL GABLES

GEORGE E. MERRICK

America's Finest Suburb

MIAMI, FLORIDA

Executive Offices: 158 EAST FLAGLER ST., Miami, Fla. Branches in all Southern Cities

Opportunity Awaits You at Okeechobee

ONE of the most rapidly growing cities of Florida, surrounded with a wealth of tropical beauty and fertile farm lands. Okeechobee City is on the north bank of Lake Okeechobee, the largest lake wholly within the confines of the United States. This city is reached by two trunk line railways and a net work of hard surface roads. It is a city of beautiful homes, building sites, and business opportunities. Okeechobee has excellent schools, churches, two good banks, a number of industries and is a big general trading center. Construction payroll at present is $30,000 per week with a $50,000 per month payroll from the fisheries.

Invest in the Lake Okeechobee Region

WE have no state tax on incomes. Florida does not collect a state tax on incomes or inheritances. And because Florida does not collect a state tax on these possible sources of revenue, many wealthy men and women are coming to this state to live, and are investing in Florida and the Lake Okeechobee region.

SMALL FARMS IN THE GREAT WINTER GARDENS

A LARGE area of small farms is found in the immediate vicinity of Okeechobee City and the lake in a great fertile belt with large areas of prairie, hammock and muck land, suited to citrus culture, general and truck farming and dairying. Okeechobee City is the center of an important cattle industry, also the headquarters of the largest catfish producing center in the United States. For information with reference to Okeechobee business property, large or small farms in the Lake Okeechobee Region and wholesale acreage throughout Southern Florida, address

CHARLES L. HENCK COMPANY, *Incorporated*

70 N. E Second St., MIAMI *"Our organization knows South Florida Real Estate"* No. Park St., OKEECHOBEE

"The people of Florida have by an overwhelming vote amended the Constitution of the State, forever prohibiting the levy of any State income or inheritance taxes."

Over 1,250,000 Acres of Choice Lands in Southern Florida

CONSOLIDATED LAND COMPANY and FLORIDA INDUSTRIAL COMPANY own outright over one million two hundred and fifty thousand acres of land, lying principally in the counties of Osceola, St. Lucie, Okeechobee, Hillsborough, Manatee, Polk, Highlands, De Soto and Lee.

These lands are suitable for general farming, trucking, fruit growing and dairy and ranch purposes, and include approximately fifty thousand acres in the Ridge and Lake region of Highlands County.

For Sale at Wholesale Only
Correspondence solicited

ADDRESS ALL COMMUNICATIONS TO

CONSOLIDATED LAND COMPANY

JACKSONVILLE FLORIDA

POSTOFFICE BOX 297

FLORIDA EAST COAST RAILWAY CO.

(FLAGLER SYSTEM)

INDUSTRIAL DEPARTMENT

Wm. R. Kenan, Jr., *President* J. D. Ingraham, *General Agent*
H. S. McLendon, *Agricultural Agent*

ASSOCIATED LAND COMPANIES

MODEL LAND COMPANY CHULUOTA COMPANY
PERRINE GRANT LAND COMPANY

OFFICERS

Wm. R. Kenan, Jr., *Vice President* Sidney Harrison, *Sec'y-Treas.*
C. S. Brumley, *Asst. Sec'y-Treas.* J. D. Ingraham, *General Agent*

THERE have been remarkable developments going on in the whole state of Florida; but these have been especially noticeable on the East Coast, all the way from Jacksonville to Key West. This development has included both residential and agricultural property. It is almost unbelievable how the prices of land have been increasing in this territory during the last few years.

The Model Land Company has large acreages of the best types of agricultural lands for sale. This land is situated in the different counties along the East Coast.

At Chuluota in Seminole County, on the Okeechobee Branch of the Florida East Coast Railway, in a beautiful, high, rolling, pine, freshwater, lake region of Central Florida, there is very desirable residential property, as well as fine fruit, vegetable and general farming land. There is a fine location here for a big tourist hotel with golf courses. Climatic conditions are fine in this locality the year 'round.

All the land companies can sell in large or small tracts, cash or terms.

MAIN OFFICES: CITY BUILDING, ST. AUGUSTINE, FLORIDA

JACKSONVILLE OFFICE: 239 WEST FORSYTH STREET

NO STATE INCOME OR INHERITANCE TAXES CAN BE LEVIED IN FLORIDA NOW

CONFIDENCE—GAINED THROUGH PROMISE, FULFILLED!

Unfortunate is the man or enterprise that promises without due reckoning as to ability to make good the promise. For more often than not failure is the outcome, with its consequent destroyed confidence and wrecked credit. But promise, fulfilled, is the creator of confidence and credit, the foundation of fortune, and the maker of happiness.

In business for a number of years; thoroughly familiar with values and conditions; offices managed by men in whom can be placed the greatest confidence, this Company CORDIALLY INVITES EVERY TOURIST AND VISITOR TO FLORIDA during the coming winter to call at our nearest office for information or advice regarding—

REAL ESTATE, RENTALS or INSURANCE

In addition to listings of some of Florida's choicest Lots, Residences, Business Property, Farm and Fruit Lands from which to make a choice for investment, we are the Selling Agents for

NEW SMYRNA BEACH

(The Development that is more than a Subdivision—a Townsite)

located on one of the finest beaches of the world, between the Atlantic Ocean and headwaters of the famous Indian River, convenient to New Smyrna (and connected to it by a new steel bridge), Daytona, Daytona Beach and Seabreeze and interior towns. Already provided with electric lights and water, macadamized boulevards paralleling Ocean and River, hard-surfaced streets and cement sidewalks, and with a program outlined and including a fine golf course and private canal for yachts and boats, New Smyrna Beach stands as a choice investment property and a standing testimonial to "Promise, fulfilled" by this Company.

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ON OLD TAMPA BAY

For information address Beach Park Co., Tampa

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EASY ACCESS TO PRINCIPAL CENTERS OF THE COUNTRY

We Handle All Classes of Real Estate

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A selection of small and large groves, also farms, with or without homes; a large list of vacant lots and well located city residences, apartment buildings and business property may be had at attractive prices by getting in touch with

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511½ FRANKLIN STREET

TAMPA FLORIDA

Ponce de Leon Springs

THE OUTSTANDING DEVELOPMENT OPPORTUNITY IN FLORIDA

PONCE de LEON SPRINGS was discovered by Don Juan Ponce de Leon in 1512 in his quest for the Fountain of Youth. This natural spring boils forth 50,000 gallons of pure water every minute throughout the year. The first settlers beside the spring were the Indians, who used it as "healing water" because of its medicinal properties.

Under the direction of Mr. A. D. Taylor, Landscape Architect, Cleveland, Ohio, the natural beauty of this historical place has been preserved and enhanced. The great spring is now the central feature of a charming townsite.

A large and beautiful Casino, containing spacious dining and ball rooms, together with an ideal bath house, has been erected for the pleasure and convenience of visitors.

The surrounding woodland park meets every requirement for an amusement center. The pool has a bathing temperature all the year. The nearby lakes offer some of the finest fishing to be had in Florida. Motor boats and canoes are maintained in the boat livery for those who enjoy boating.

Tennis courts and recreation areas have been provided, together with a wading pool and playground, for the enjoyment of the children.

A beautiful cascade is supplied by this large volume of water from the Spring. When illuminated at night by varied colored lights under the rushing water this cascade is enchanting.

Nowhere can be found a more ideal spot for a pleasant home.

The 1000 acres of rolling forest land surrounding the Spring and Atlantic Coast Line Railroad station is platted by Mr. Taylor into a perfect modern townsite, including an 18-hole golf course.

The North and South new asphalt State auto highway passes through the center of the property. An East and West cross state highway is planned from Daytona Beach to Ocala through Ponce de Leon Springs.

The platted lots have a sale value of $10,000,000.00 to $20,000,000.00. This remarkable property can be bought for $700,000.00 on easy terms.

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WHERE THE PEOPLE PLAY

REAL ESTATE

VALUES HAVE INCREASED THE MOST RAPIDLY

THIS has been proven in Atlantic City and many other noted resorts, but nowhere has the increase been so great as in Miami, the Magic City of Florida, that has sprung into prominence as the Premier Winter Resort City of America, where the wealth of the country is concentrated in the winter season.

FROM A VILLAGE OF 2,000 TO A CITY OF 100,000 IN A QUARTER OF A CENTURY

With a building programme in 1924 in Miami and Miami Beach of over $20,000,000, comprising 175 apartment houses, 20 hotels, a dozen banks and business buildings and hundreds of homes, it is leading the entire United States.

LARGE FORTUNES HAVE BEEN MADE BY CAREFUL INVESTMENTS IN MIAMI.

Many of them have been handled through this office. We are now featuring two high class sub-divisions which we own. One is BISCAYNE COURT, a property with an assured future. The other is "BELMAR on Beautiful Biscayne Bay." These are both high-class properties but moderately priced. Make our office your headquarters in Miami or write for detailed information and beautifully illustrated literature on Miami and Florida.

William I. Phillips

Realtor

Twenty-four years in the Real Estate Business in Florida

References—Bank of Bay Biscayne, First National Bank, Miami Chamber of Commerce

24 and 26 BAY SHORE BOULEVARD

MIAMI, FLORIDA

$2,394,000.00

Two Million Three Hundred Ninety-four Thousand Dollars is the amount of building which was financed by the Palm Beach Guaranty Company since the first of this year, either in individual mortgages or issues of 8% First Mortgage Bonds.

This represents a vast portion of the building done in the Palm Beaches since January 1st, and has been the means of bringing to West Palm Beach a large amount of capital for development purposes

THESE FIRST MORTGAGES AND FIRST MORTGAGE BONDS
PAY 8% INTEREST

PALM BEACH GUARANTY COMPANY

Investment Securities

Second Floor, Guaranty Building
WEST PALM BEACH FLORIDA

Northwood

Mile and Quarter from Center of the City

THE owners of Northwood are men of reliability and with important connections in the city and all-year residents. They have built large homes in Northwood and reside there. The development and welfare of Northwood is intertwined with their home life and their business investments in the city.

More homes built and occupied by home owners in Northwood, in the same space of time, than any other subdivision ever put on in West Palm Beach or Palm Beach.

Thousands of dollars profits have already been made by our Northwood buyers.

$1,432,750.00 of Lots Sold the Last 60 Days

NORTHWOOD

PINEWOOD DEVELOPMENT COMPANY, *Owners*

NORTHWOOD TERMINALS
NORTHWOOD HILLS

GEO. FRYHOFER, *Sales Manager*
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FLORIDA

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30,000 ACRES with all kinds of game—large number of fine lakes where fishing can be enjoyed to the fullest—best proposition in state for an up-to-date fishing and hunting club—hard road being built through this tract.

Price only $5.00 *per acre*
WITH GOOD TERMS IF DESIRED.

6,000 ACRES almost adjoining city limits of Lakeland—the best town in the best county in the state. This is an ideal proposition for developing into small farms which will retail for many times the price at which it is now available. We will be glad to take a good block of stock with a company organized to develop. *This is a money-making opportunity.*

Price $50.00 *per acre*
WITH REASONABLE TERMS
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South Florida Lands

Have advanced 100% in past four years, while in many states they have depreciated 50%.

Where will you invest your money?

Our guess is—"That it will be in South Florida where your success is insured, where you are able to draw on the banks of every state in the Union in payment of our much sought-for lands."

We consider ourselves indeed very fortunate to be able to offer the investing public some of Florida's richest undeveloped land at prices that will double within two or three years and on terms that enable you to share in South Florida's wonderful harvest. We know values, and are offering our years of successful experience as service to you.

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ORLANDO, FLORIDA

Reference:
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Assets over $500,000.00

SARASOTA FASTEST GROWING CITY IN SOUTH

The following statistics for the year ending September 1 are authentic:

Increase in bank deposits	124%
Increase in assessed valuations	140%
Increase in building, (six months)	203%
Increase in railroad tonnage	145%
Increase in occupation licenses	100%
Increase in telephone connections	100%
Increase in postoffice receipts	153%

H. B. WILLIAMS CO., *Realtors*

Leading dealers in all sorts of real estate holdings, speculative property, investment property, subdivision property, farms and homesites.

FIRST FLOOR
SARASOTA HOTEL SARASOTA, FLORIDA

BRADENTON *The Friendly City*

THE city of glorified opportunity; a city of thriving business, beautiful homes naturally beautiful, and all-year-round outdoor sports. An investment in this locality will make an excellent profit in a short time.

Call, Write or Wire to

Carl Hasleton Realty Company

BRADENTON, FLORIDA

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We have several hundred thousand acres for sale in Dade, Palm Beach, Highlands, Osceola, Collier and Charlotte Counties.

We still have some good tracts in the beautiful Indian Prairie section.

We have some very desirable Dixie Highway frontage.

We have an especially desirable property for development in Palm Beach County.

Lands are still cheap, but going fast.

We have tracts from one section to one hundred thousand acres.

We Have The Prices

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HOMES

IMPROVED *and* UNIMPROVED CITRUS LANDS

TIMBER TRACTS
PHOSPHATE LANDS
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BAY OR GULF FRONT PROPERTIES IN LARGE OR SMALL TRACTS
Suitable for Subdivisions on West Coast of Florida

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RESIDENCES ACREAGE
BUSINESS PROPERTIES

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Personal attention given all transactions.
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"ESTABLISHED 1887"

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Is the County seat of Manatee County, one of the most productive counties in the whole State, both in Citrus and vegetable growing. The most healthful climate in the South is found here.

Bradenton is one of the fastest growing cities in South Florida, being situated on the banks of the noted Manatee river and just a few miles from the Gulf of Mexico, where fishing and bathing are enjoyed the year 'round.

In this beautiful city and productive county, we have exceptional bargains to offer in business property, residential, farms, groves and subdivisions. We have real money making bargains in all the above mentioned properties.

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Palm County

Millions of Dollars
HAVE BEEN MADE OUT OF
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WE HAVE MADE MONEY FOR OTHERS
MAY WE HELP YOU MAKE YOURS?

We have a very large list of property of every description for sale. Business property, both improved and unimproved; apartment house sites and apartments; building lots and dwellings of every description; factory and warehouse sites; acreage, both large and small tracts; orange groves, farms and country estates.

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Realtors

MOUNT DORA FLORIDA

FLORIDA
Banana Plantations

PRODUCE MONTHLY INCOME

SIX VALUABLE BANANA FACTS

1. The banana plant bears in 9 to 12 months.
2. Bananas mature each month in the year.
3. Each plant bears one bunch the first year and three bunches each year thereafter.
4. Bananas are planted 400 bulbs to the acre.
5. Bunches weigh from 40 to 100 pounds each.
6. Bananas sell at wholesale from 6c to 8c per pound.

OWN A FIVE-ACRE PLANTATION
ON OUR EXTENDED PAYMENT PLAN

Our 5-acre Commercial Banana Plantations, now being planted in one of the most fertile valleys, assure the owner a substantial income, while the investment is limited.

The location is near Winter Haven on rich muck lands most adaptable to banana culture. Climate and fresh water lakes make our planting ideal, practically eliminating the fear of killing frosts.

Supervising the entire development is a practical banana grower with years of valuable experience, assuring the most successful methods of planting and cultivation.

Abundant Success Awaits the Grower of Florida Bananas

This is your opportunity to get in on what will without doubt be one of the State's greatest industries. We will prepare, plant and deed to you one of our 5-acre Banana Plantations for a very reasonable down payment, with balance on easy terms which enable the buyer to realize some returns from his investment to apply on deferred payments.

Our plan has received highest endorsement and will stand complete investigation. We invite you to communicate with us and will gladly explain, without obligating you in any way, how you can secure a share of the big profits being made from Florida banana growing. Write today for our illustrated booklet and other information.

TAYLOR-ALEXANDER CO.

"The Original Banana Plantation Developers"

Beymer Building WINTER HAVEN, FLORIDA

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Do you want to get away
From the grind of every day—
From the drudgery of things you have to do?
Do you want to settle down
Near a lively, busy town,
Where the joy of living will appeal to you?
Do you want to scent the breeze
Coming through the orange trees?
Do you want to hear the birds call—loud and clear?
Are you seeking perfect health
That's combined with certain wealth
And an income from an orange grove each year?

Do you want a piece of land
That will grow to beat the band
All the different garden crops that you enjoy?
Do you want to make a "Nest,"
And a permanent bequest
For the future welfare of each girl and boy?
Do you want a sunny clime
Where there's fishing all the time?
Where there's ducks and deer and quail and other game?
Where the summer climate's cool,
And within each lake a pool,
You can swim in January—just the same?
Do you want to buy this land
On an easy-payment plan,
With about your monthly outlay for cigars?
Do you want to read a book
That will make you want to look
On the finest land that lays beneath the stars?
Send a letter right away;
Put it in the mail today,
We will send this Booklet absolutely FREE.

After you have read it through,
If a thought occurs to you—
Just address another letter here to me.
We will answer, straight and true,
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We have nothing to evade or to conceal
On an Orange County Farm:
Life will take on added charm.
And you'll never lack a dollar—nor a meal.

Send FOR OUR BIG, FREE, ILLUSTRATED BOOK—"TWENTY ACRES AND PLENTY." IT TELLS OF ALMOST UNBELIEVABLE PROFITS MADE FROM TRUCKING AND FRUIT-GROWING IN OUR PART OF FLORIDA. ALSO ABOUT SICK AND OUT-OF-WORK CLAUSES AND OTHER PROTECTIVE FEATURES OF OUR CONTRACT. ADDRESS SYLVESTER E. WILSON, ORLANDO, FLA.

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All improvements and every modern convenience are at the disposal of every land owner. The lots are large and restrictions are such as to insure the most desirable of neighbors.

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LAKE WORTH
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the benefit of his ten years' residence there, during six of which he published THE LAKE WORTH HERALD, in any and all matters pertaining to Real Estate.

We are authorities on valuations and have closely followed the trend of prices and developments.

When in the market to buy or sell, please consider us at your service.

Buy on our advice and we guarantee to double your investment within two years. Will gladly refer you to those for whom we have done this.

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ORLANDO city properties and lands adjacent to the city offer the investor a most attractive opportunity for investment. We handle substantial, conservatively valued properties, and can offer real opportunities for you to make money in

LANDS, FARMS, GROVES, CITY LOTS,
LEASES, BUSINESS OPPORTUNITIES

If you anticipate investing or starting business in Florida, we can serve you efficiently and give you the information you desire. We shall be glad to answer any inquiry.

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Real Estate anywhere in Southern Florida. Our Mortgage Department will place your funds at 8% net to you and make collections free.

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In the high lake region of Florida. For information regarding water-fronts for subdivisions and homesites

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Has probably enjoyed more benefit from the South's recent development than any other city, as is evidenced by the following:

Miami and Miami Beach building permits, January 1 to October 1, 1924 . . . . . $19,079,063
Real Estate Transfers month of September (only) 6,640,029

These items are indicative of a sound, healthy, prosperous community

INVEST IN MIAMI AND VICINITY

OUR LISTINGS INCLUDE CLOSE-IN ACREAGE, DOWNTOWN BUSINESS PROPERTY, HOTELS, APARTMENTS AND HOMES

Crow-Reeder Company, *Realtors*

Crow Building (Here 11 Years) MIAMI, FLA.

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MAGNOLIA PARK ADDITION

KISSIMMEE, FLORIDA

LOTS 35 x 132½ ft. Price $50.00 Each. Terms $10.00 cash; Balance $5.00 per month. Abstract with each lot, showing perfect title. No taxes. No interest.

VINE, LIMIT AND BERMUDA STREET LOTS $75
CORNER LOTS $75 TO $125 — ALL OTHER LOTS $50

BUY LOTS IN MAGNOLIA PARK
BUY TODAY

When you come to the Sunny Southland, if selection does not suit, you may exchange for any unsold lot. Magnolia Park Addition, being the very last acreage of vast holdings of a great land company, was purchased at a bargain. We want you to share our prosperity. We want to turn these few lots in 1924. We are making a price on them for quick returns. Never again will you have such a golden opportunity.

ASK ABOUT OUR FREE BUNGALOW

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Magnolia Park Addition Co.

KISSIMMEE FLORIDA

G. ALLEN BANKS

ALLEN BANKS BUILDING
GREENWOOD, S. C.

OVER 500 FARMS AND TIMBER TRACTS FOR SALE

$6.00 PER ACRE AND UP

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FLORIDA

SUNILAND— The Land of Flowers; the Playground of the Rich; the Paradise of the Poor. And of all of FLORIDA's Jewels, TAMPA is the brightest of them all—unquestionably developing faster than any other city in the country—destined to be the greatest city in the Southeast.

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"Something New"

THE public is the customer of the textile plants. It makes no difference how many in between sales are made, if the consumer does not buy your goods, your plant is not busy.

Now think of the thing which influences the purchase of a piece of goods or a made-up garment. Picture what a woman does when she is first attracted to a piece of fabric. She feels it. We would say she sees what kind of a "hand" it has. She looks at it closely. This feel and close look are often the acts which influence the purchase of a fabric or garment. Think of it—the part that the finish plays here—for the salesman or woman to mention that it is "something new."

Remember that the public likes variety, and that there are no better sales words in merchandising than "something new."

We'll be glad to help mills find "something new" in finishing their products. And finding "something new" does not necessarily mean new machinery. Simply by re-arranging machines already in use we have in numerous instances been able to find that "something new" which has made plants buy.

Our Southern Plant

It was to help render this complete service that we located a Butterworth plant in the South, at Greenville, South Carolina.

Now we are in immediate touch with the South—we know its spirit—just as we are closely identified with New England through our Providence, R. I. Office.

Our Southern plant is equipped to render prompt service on almost any kind of repair work as well as in the making and of refilling rolls.

H. W BUTTERWORTH & SONS CO

Established 1820

PHILADELPHIA, PA.

Canadian Representative:
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W. J. Westaway Company

Providence Office:
Turks Head Building

Greenville, S. C., Plant:
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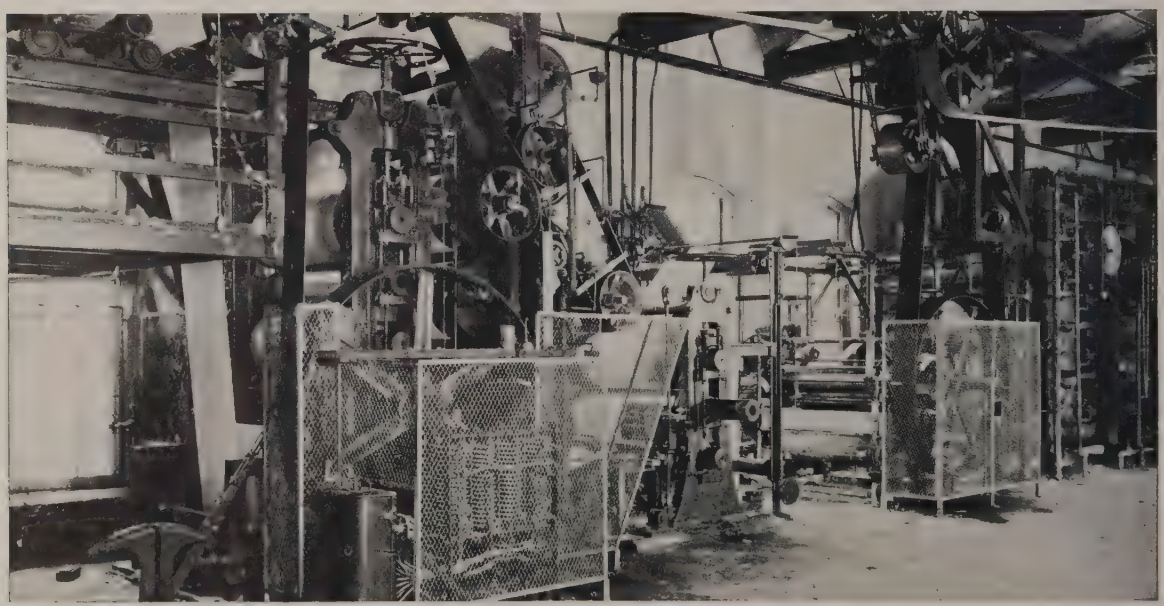
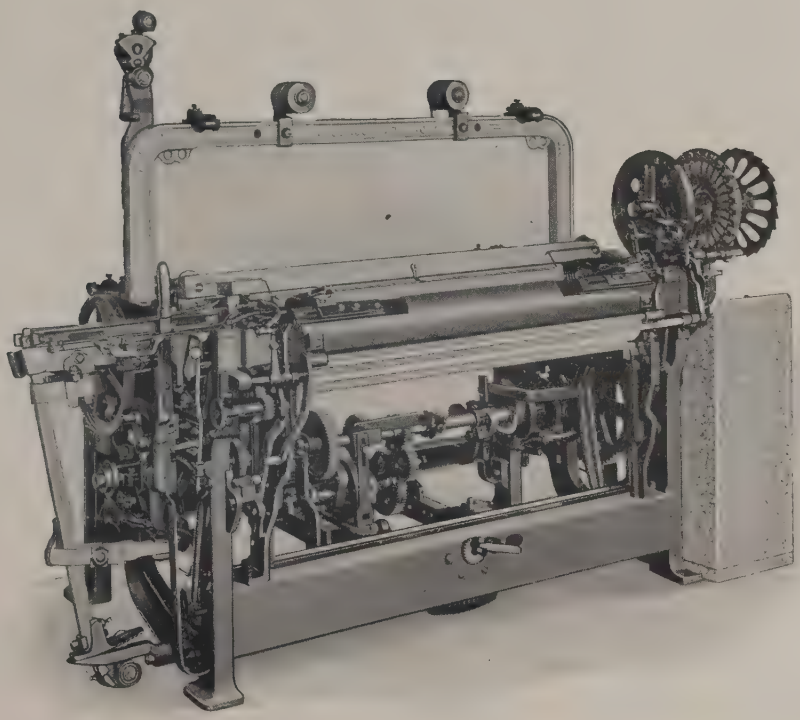


BUTTERWORTH FINISHING MACHINERY IN RANGE.

BUTTERWORTH

Finishing MACHINERY

There is a New Automatic Loom on the Market

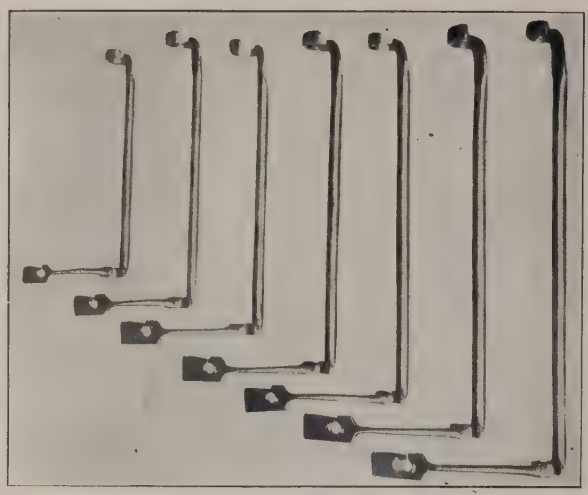


The NORDRAY HIGH SPEED

ALREADY RUNNING IN OR ORDERED
BY EIGHT REPRESENTATIVE MILLS

Built by

THE HOPEDALE MANUFACTURING CO.
MILFORD, MASSACHUSETTS
Southern Office at GREENVILLE, S. C.



The first and only manufacturers of Flyer Pressers in the South. This company is prepared to furnish the industry with Flyer Pressers that make Profits—Made of Norway Iron, and fitted to flyer at their factory.

QUALITY PRODUCTS HELPFUL SERVICE

Beginning its brilliant record of service to the Southern Textile Industry more than a quarter of a century ago, with the determination to build a reputation for quality products and a policy of helpfulness to the then infant industry, the SOUTHERN SPINDLE & FLYER CO., Inc., has more than achieved its purpose.

It has kept pace with the tremendous growth of the industry, until today this company is organized and equipped to take care of the calls for repairing and overhauling for the whole Southern Textile Industry, from Virginia to Texas. A policy of growth which this company will continue.

Manufacturers—Overhaulers
Repairers of
Cotton Mill Machinery
Catalog on Request

SOUTHERN SPINDLE & FLYER CO., *Inc.*

WE MANUFACTURE, OVERHAUL AND REPAIR COTTON MILL MACHINERY

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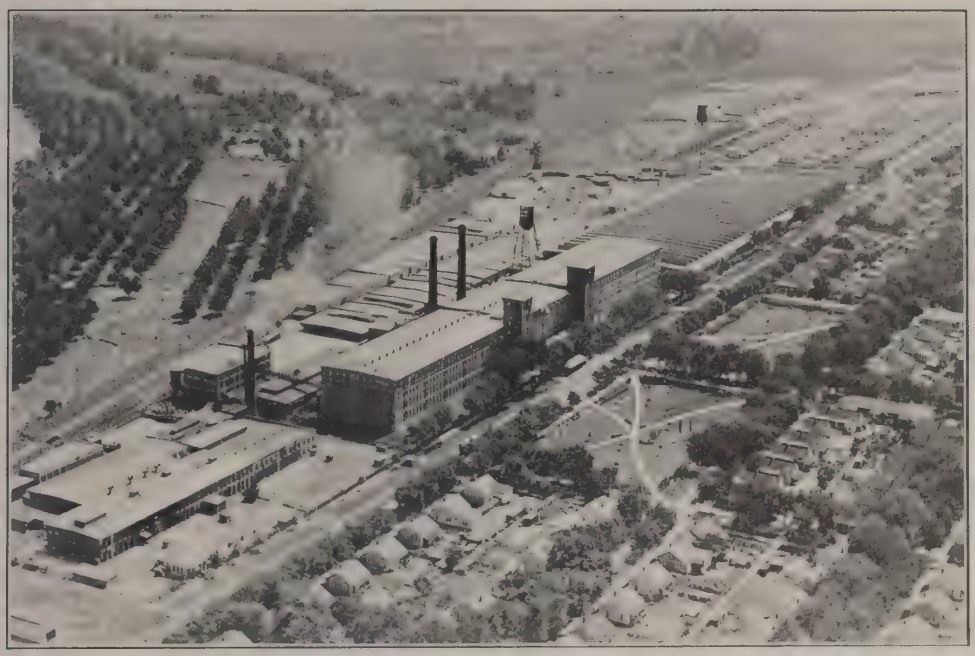
ORGANIZED IN 1893

ONE OF THE SOUTH'S OLDEST COTTON FIRMS



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West Point Manufacturing Co.

LANETT MILL LANGDALE MILL RIVERDALE MILL
FAIRFAX MILL SHAWMUT MILL
WEST POINT UTILIZATION CO. WEST POINT POWER CO.

WEST POINT, GEORGIA

THE chief products of these mills are Ducks, Drills, Twills, Sheetings, Crash and Towels. They operate 185,000 spindles and 4500 looms. The annual consumption of cotton is 100,000 bales. Hydro-electric power is supplied by the company's own plant on Chattahoochee River at Langdale, Ala. Employment given 5000 operatives. Annual payroll is $3,500,000.

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THE DUNSON MILLS

LA GRANGE, GEORGIA

MANUFACTURERS OF

HIGH GRADE COTTON FABRIC SPECIALTIES

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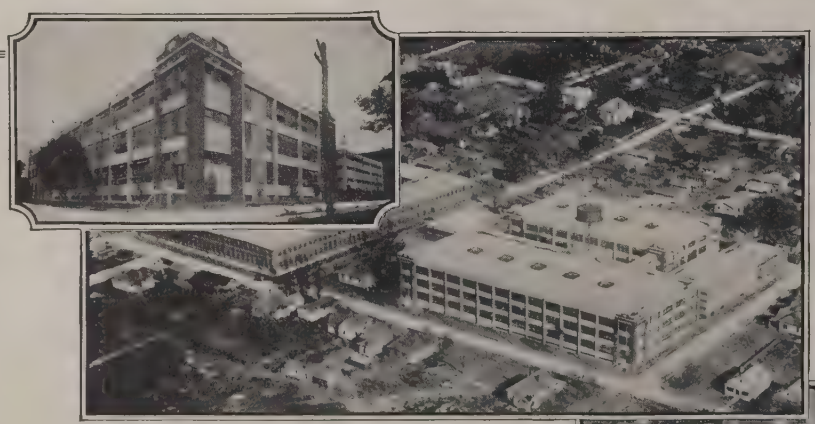
Manufacturing and Converting Trades

CURRAN & BARRY—*Agents*—320 Broadway, New York



THE best raw material—equipment—labor—and supervision in both spinning and mercerizing are the factors which make Standard Mercerized Yarn Superior.

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Sales Office: LAFAYETTE BUILDING, PHILADELPHIA, PENNSYLVANIA

Canadian Representative: WM. B. STEWART & SONS, TORONTO-MONTREAL

APART from direct consumption as food, products derived from Corn are widely used in manufactured food-products and likewise in many highly important industrial processes. The products from American-grown Corn have rendered valuable assistance in the extraordinary industrial development of the South:

Cotton Mills, Bleaching, Dyeing and Finishing Plants, Paper Mills, Adhesive Manufacturers, Foundries, Confectioners, Bakers, Canners, Ice Cream Manufacturers and many others know the reliance to be placed in:

"EAGLE STARCH" — CORN SYRUP — "KORDEK"
SPECIAL DEXTRINES — "SPECIAL PAPER STARCH"
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(Refined Corn Sugar)

THE GREAT ACHIEVEMENT OF SCIENTIFIC METHOD APPLIED TO MANUFACTURE

We offer our products, experience and organization to assist in meeting the various problems of manufacturing processes, already established as well as in course of development.

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The Davison Chemical Company

ESTABLISHED 1832

SULPHURIC ACID

50° 60° 66°

ACID PHOSPHATE
SUPERPHOSPHATE
DOUBLE SUPERPHOSPHATE

MAIN OFFICE

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Sulphuric Acid
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Fertilizer

IN 1839, Eugene Grasselli crossed the Alleganies and began the first chemical manufacturing in (what was then) the Far West. The Grasselli Chemical Company is still giving service to industry in the same spirit as that of its pioneering founder.

Of course, Price and Delivery are important in every transaction, but if you have been getting *merely* price and delivery—without interested service and co-operation—it will pay to try Grasselli on your next order.

The Grasselli Chemical Company

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ESTABLISHED 1839

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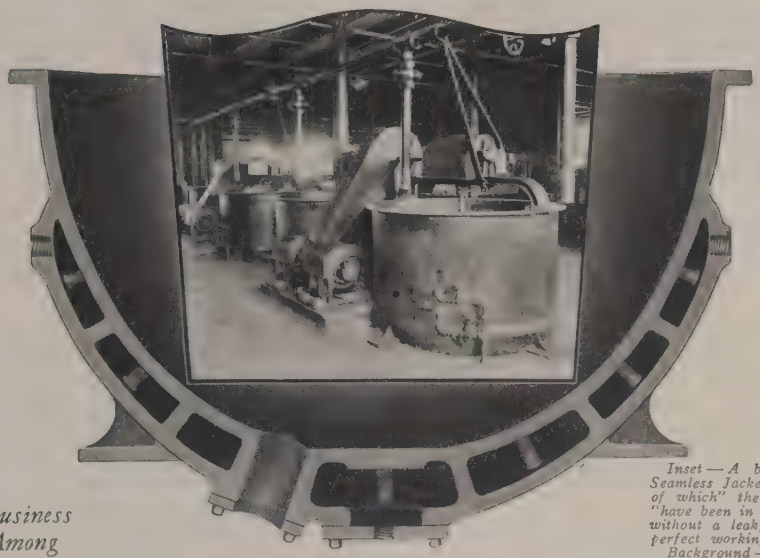
NEW YORK AND EXPORT OFFICE: 345 MADISON AVENUE

GRASSELLI GRADE
A Standard Held High for 85 Years



Inset — A battery of DOPP Seamless Jacketed Kettles, "two of which" the customer writes, "have been in use over 35 years without a leak, and are still in perfect working condition."
Background — Cross-section of DOPP Seamless Jacketed Kettle, showing kettle, jacket, stay-bolts, (and outlet when desired) all cast in one solid piece.

Is Your Business Classed Among These Users of

DOPP
EQUIPMENT

Manufacturers of

Abrasives
Artificial Leather
Artificial Silk
Baked Goods
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Butchers, Packers
Carbon Paper
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Drugs
Dyestuffs
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Glass
Glues, Pastes
Graphite
Grinding Wheels
Ink
Insecticides
Insulated Products
Linoleum
Margarine
Matches
Oils, Lubricants
Ointments, Creams
Paper
Pencils
Phosphorus
Polishes
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Salt
Sand Paper
Soaps
Tanners
Textiles
Tobacco
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ADOPT THE DOPP

The "Cooking Pots of Industry"

All over the world, in more than 60 different kinds of industry requiring cooking, heating, evaporating or mixing processes, in open vessels, or under vacuum or pressure, DOPP Jacketed Kettles, Mixers, Vacuum and Pressure Pans are helping manufacturers to reduce costs and improve the quality of their products. Many DOPP Kettles have seen from 35 to 40 years of continuous service. Because of the special process of manufacture, DOPP Jacketed Kettles are

Seamless and Leakless Cast-in-One-Piece

Jackets, stay-bolts and all. Not put together; the complete kettle is poured at one time from one ladle of iron. By the DOPP process the iron does not come into contact with molding sand; this insures a smooth surface inside and out. No grinding; therefore no impairment of structural strength or wearing qualities. No seams or joints, no parts fitted in—just one solid, seamless piece of jacketed apparatus. Special iron, high in silicon content, with a tensile strength of 35,000 to 40,000 lbs., assures safety and resists chemical action years longer than ordinary cast iron.

There is a type of DOPP Kettle, Vacuum or Pressure Pan and Agitator to meet most requirements; all jackets built and tested for 150 lbs. hydrostatic pressure. Higher pressures when desired. All backed by the broadest machinery guarantee you ever read, *"to at any time replace any kettle or parts found defective in workmanship or material, etc.*

Catalog No. 7 on Request

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SEAMLESS JACKETED KETTLES, MIXERS, VACUUM AND PRESSURE APPARATUS

Inquiries are solicited regarding

HYDROSULPHITE LIQUID SULPHUR DIOXIDE

BLEACHING AND DYEING PROBLEMS

Also regarding use of these chemicals in

Tanning, Preserving Wood, Refrigeration, Fumigation and Other Uses

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"A Technical School With a National Reputation"

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FISH SCRAP

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Brokers and Commission Merchants
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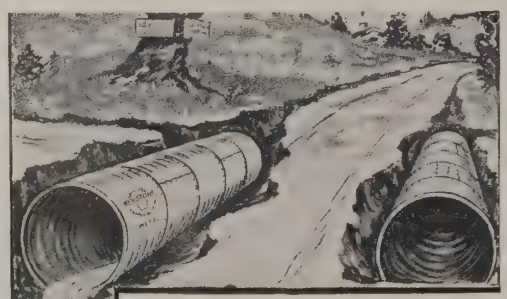
STEAMSHIP and FISH FACTORY SUPPLIES
FISH MEAL *for* FEEDING



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THE Keystone Copper Bearing Metal is what makes our culverts resist rust and corrosion, an enemy which attacks the exposed surface of every culvert. These claims have been substantiated by the American Society for Testing Materials of Pittsburgh, Penna.

Our products represent the highest standards of quality and utility, and are made by craftsmen of skill and experience whose worthy ambition is to serve you capably and well.

Carolina Metal Culvert Co.
MANUFACTURERS
SALISBURY NORTH CAROLINA

SYDNOR'S SUPREME SERVICE

WELL DRILLING
AND
DEEP WELL PUMPS

We do the engineering, and have had 27 years' experience solving water problems satisfactorily for textile mills.

We have a Very Efficient System of Pumping that we wish to tell you about.

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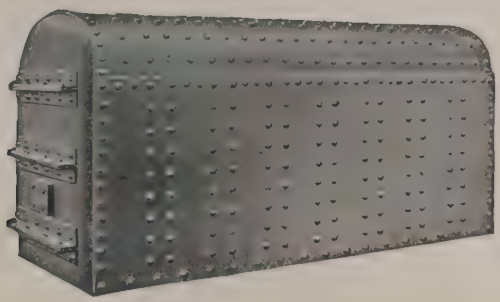
Sydnor Pump & Well Co., Inc.
Established 1889
RICHMOND, VIRGINIA

Galvanizing Kettles

Iron and Steel Tanks of Various Description, ⅜ in. to 2 in. in thickness—Steel Plate Construction



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ESTABLISHED OVER 50 YEARS

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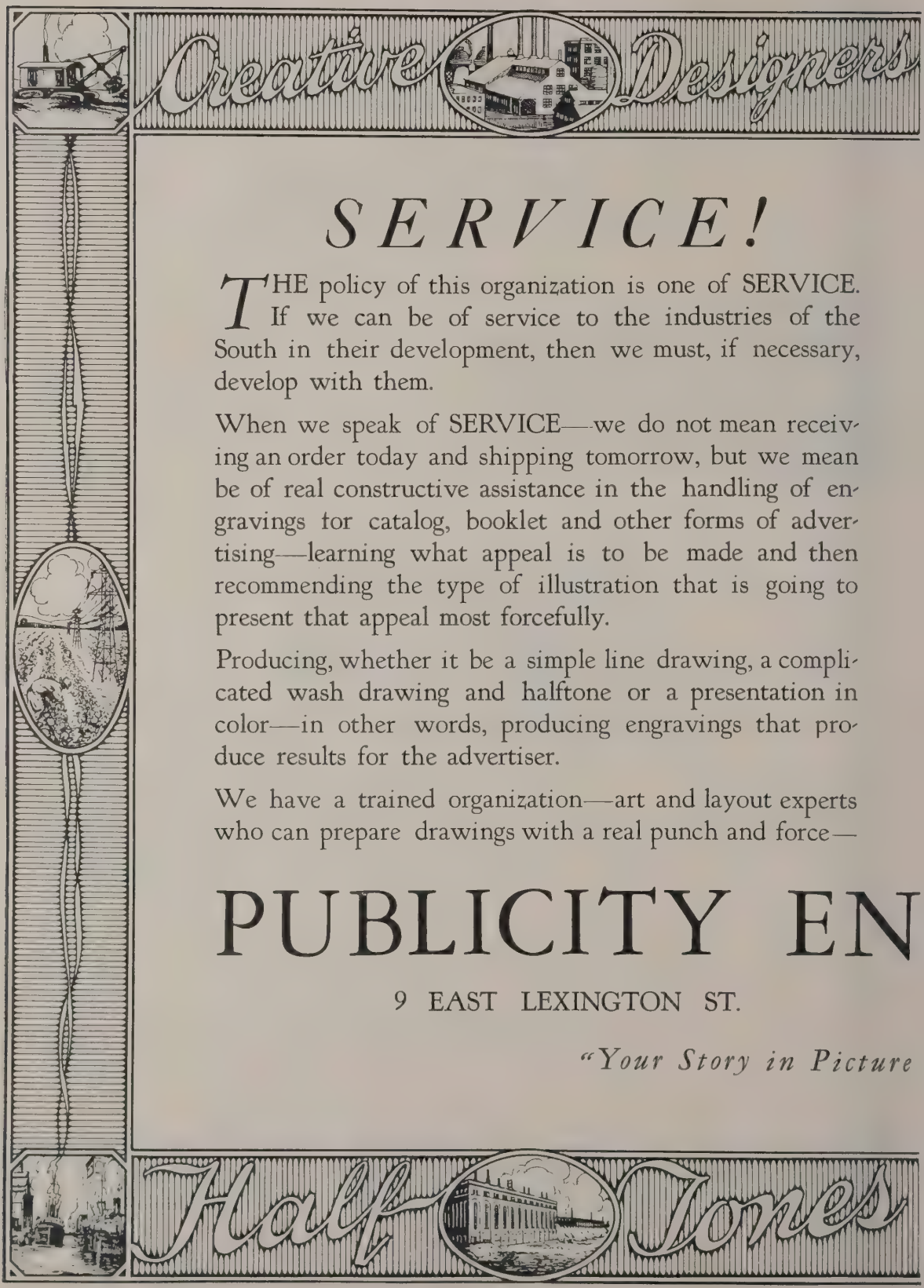
For Sheet Steel and Tin Plate Mill


Creative Designers
SERVICE!
THE policy of this organization is one of SERVICE. If we can be of service to the industries of the South in their development, then we must, if necessary, develop with them.
When we speak of SERVICE—we do not mean receiving an order today and shipping tomorrow, but we mean be of real constructive assistance in the handling of engravings for catalog, booklet and other forms of advertising—learning what appeal is to be made and then recommending the type of illustration that is going to present that appeal most forcefully.
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We have a trained organization—art and layout experts who can prepare drawings with a real punch and force—
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"Your Story in Picture
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SERVICE!

and a corps of engravers who know how to make engravings that are snappy, contrasty and have character.

This company has been handling the engravings for the Manufacturers Record for a number of years and all of the illustrations in the Editorial Section and a great many in the other sections of this splendid publication—"*The South's Development*"—are products of our plant.

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This business has been built upon the foundation of SERVICE and it is our firm conviction that if we can serve, the orders will take care of themselves.

GRAVERS *Incorporated*

BALTIMORE, MARYLAND

"Leaves Nothing Untold"

32 Years of Service to the Industry of the South

We have one of the best equipped plants in the U. S.

for REWINDING
REBUILDING
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Coils Manufactured for All Makes of Machines

We carry a large stock of motors for sale—New and Rebuilt

EXPERIENCE and EQUIPMENT—A two-fold assurance that work entrusted to us will be handled satisfactorily

Chattanooga Armature Works

CHATTANOOGA, TENNESSEE

(Patented October 6th 1914)

Moccasin Self-Oiling Bushing

OIL soaked white pine inserts are set transversely in high grade Phosphor Bronze and when machined to size becomes a part of the bushing itself.

The oil filters through these feeders in sufficient quantity to secure constant lubrication. No oil can waste to damage floors, belting or stock. No grit reaches the bearing surface. Lubrication is required only two or three times yearly. Used by hundreds of manufacturers as standard equipment.

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CHATTANOOGA TENNESSEE

"Zones of Quiet"

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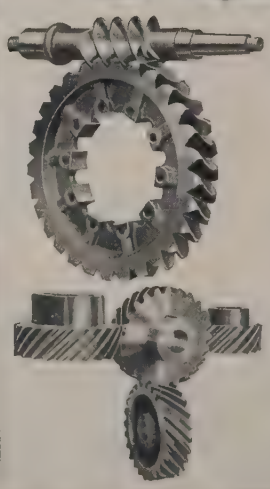
Accurately Generated

GEARS



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of All Kinds
SPUR, BEVEL
HELICAL, WORM
INTERNAL
BAKELITE
and
RAWHIDE PINIONS
Spur and Worm Gear Speed-Reducing Units

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MANUFACTURERS
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TRANSMISSION MACHINERY

Including Pulleys, Hangers, Shafting, Pillow Blocks, Couplings, Collars, Belt Tighteners, Floor Stands, Mule Pulley Stands, Rope Sheaves, Etc.

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Including Raw Stock Dyeing Machines, Piece Goods Continuous Dyeing Machines, Dye Liquor Tanks, *also*

SYRUP KETTLES DRY CAN MACHINES SIZE KETTLES
CAST IRON STORAGE TANKS BELT AND STEAM PUMPS
EVAPORATORS CANE MILLS

AND

LIGHT AND HEAVY
GREY IRON CASTINGS

Write for Catalogues, Circulars and Prices

We have been serving the South since 1879—and our service improves constantly

EVERYTHING FOR THE MILL

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Honest Quality—Prompt Service—Square Treatment

And we are prepared to render these things to every patron. We believe in Preparedness, and have surrounded ourselves with every facility to enable us to live up to our motto in dealing with our Trade, and if dissatisfaction arises, due to a weakening of any one of the Links, we respectfully ask that you tell US frankly about it, so that WE may have an opportunity to trace the trouble and remedy it. Don't draw away from us, in Wrath—but draw toward us, in Trust.

We represent

JEFFREY MACHINERY
for OIL MILLS, FERTILIZER PLANTS, SAW MILLS, POWER PLANTS, ETC.

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WHICH RETAIN THEIR LEADERSHIP IN THE INDUSTRIAL WORLD

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THE BELT FOR ENDURING SERVICE

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MACHINERY — SUPPLIES — CONSTRUCTION — REPAIRS

Our large stock and well developed organization enables us to furnish QUALITY merchandise and satisfying SERVICE at competitive PRICES

Let our Engineering Department solve that QUESTION of Equipment

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Prompt service on General Repair Work
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We ship from stock, Armature Coils, Field Coils and Brass Bearings of our manufacture for all makes and types of Electric Motors—especially Mining Equipment.

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Manufacturers of

BANK, OFFICE *and* STORE FIXTURES

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Twenty-two years ago we started selling Electrical Supplies and Experience. Today two well-stocked warehouses, with an experienced organization, enable us to furnish the buyer a bigger and better service.

DUNCAN METERS AND TRANSFORMERS
ARROW E. WIRING DEVICES
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WHEELER FIXTURES AND REFLECTORS
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STANDARD QUALITY EUREKA 2 LB. STANDARD QUALITY

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Manufacturers & Importers

JUTE BAGGING COTTON TIES

SUGAR BAG CLOTH PATCHES

CAROLINA PLANT No 1.

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CAROLINA BAGGING CO.
HENDERSON, N.C.

One of the Greatest Enterprises in the World

POULTRY—The coming "poultry center" of the United States is the SOUTH. Still in its infancy—the past few years have shown marked progress and development.

WHY? The flexibility of Newtown Giant Incubators solved the problem. The "faithful hen" has been imposed upon. Alas! no more. Newtown Incubators have revolutionized our Homeland. Start on a small scale—increase the Newtown as your business grows. Simple and easy to operate– produces big batches of strong, healthy baby chicks.

This Modern Daylight Plant is Worthy Evidence of Our Position in the Incubator World

Your trip through Virginia—The Gateway of the South—is not complete if you fail to stop at our plant and see how Giant machines are manufactured. Visitors welcome.

Newtown Giant Incubator Corporation

HARRISONBURG *"In the Heart of the Shenandoah Valley"* VIRGINIA

You Need A Huther Brothers DADO HEAD

The adjustable groover that cuts with or across grain. Easily adjusted without the use of screws, just add or remove inside cutters to make the desired cut. May be returned if not satisfactory. Sent on approval.

Write for our new catalog No. 43, showing many special tools for your saw rig.

HUTHER BROS. SAW MFG. CO.

ROCHESTER, N. Y. *Makers of Better Saws for More Than 50 Years*

SAWS

Mississippi's as well as the South's oldest Saw Manufacturers offer you today better saws, better service and better repairing than is possible to obtain elsewhere. Ask for citations, or, better still, give us a trial.

J. H. MINER SAW MANUFACTURING CO.

MERIDIAN MISSISSIPPI

A NEW HIGH PRODUCTION SELF-OILED, ALL-GEARED DRILL

Observe Square Column and Spacious Table. Has great Strength, Surprising Power, Unusual Durability, Multiplied Productive Capacity. 8 Geared Speeds, 8 Geared Feeds, all instantly available. No take-off gears. This No. 246 size drives up to 1¾" high-speed twist drills to maximum working limit. Price is doubly impressive, quality considered. Let us help solve your drilling and tapping problems.

Let us send new Catalog "G"

Exclusively Manufactured by

BARNES DRILL CO.

841-849 Chestnut St. Rockford, Ill.

Builders also of Sliding Extension Gap Lathes

ATKINS Silver Steel SAWS

SILVER STEEL

In 1857 when E. C. Atkins began making saws he realized that to make high grade saws it would be necessary to have a high grade steel.

Being an expert metallurgist he set to work to find such a steel. After months of experimenting Silver Steel was born.

This steel—Atkins exclusive formula has the quality of receiving a hard, tough temper, a steel that takes a keen, sharp cutting edge and holds it longer than other saws.

Write for literature.

E. C. ATKINS & COMPANY, Inc.

"The Silver Steel Saw People" Established 1857

Home Office and Factory, INDIANAPOLIS, INDIANA

Canadian Factory, Hamilton, Ont. Machine Knife Factory, Lancaster, N. Y.

Branches carrying complete stocks in the following cities:

Atlanta	New Orleans	Seattle
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Central location means Service in time of need

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5 Northern Oklahoma Field.
6 Southern Oklahoma Field
7 Burkburnett-Electra Field
8 Ranger Field
9 Mexia Powell Field
10 Southern Arkansas Field
11 Northern Louisiana Field
12 Gulf Coast Field.
13 New Colorado Field, Craig
14 Wyoming Field, Salt Creek
15 16 Montana Field
17 California Field—San Joaquin Valley
18 California Field—Los Angeles Basin

12-inch Discharge Pumps biggest ever built in mid-continent.

Our central location in the "oil capital of the world" assures the promptest possible delivery of both pumps and parts to all important fields. This convenience, added to such other features of the GASO family as fewer but stronger parts, instant accessibility of valves and proved dependability, makes it easy to see why GASO Pumps have achieved leadership in such a short space of time. You haven't experienced the best in oil-industry pumping service until you have tried GASOS. Send for interesting 64-page catalog.

GASO PUMP & BURNER MFG. CO. •• Tulsa, Okla.

Picture above shows section of business district of Tulsa—"the oil capital of the world"—the home of GASO Pumps.

GASO PUMPS
for oil Industry uses

Electrotypes---

Like everything else, there's a lot in the making of them. In a plant where only the most modern equipment and workmen who know their business are on the job day after day, *good* electrotypes are the rule!

The production of good electrotypes is our business—copper, nickel steel, lead process for color plates. Care, thought, accurate measuring of plates and blocks, all that the most up-to-date methods can put into electrotypes are found in those coming from Shane-Beever plant.

Think of us the next time you are looking for good electrotypes.

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Company 227-229 NORTH HOLLIDAY STREET
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HIGHEST GRADE
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FORT SMITH, ARKANSAS
LARGEST PLANT OF ITS KIND IN THE COUNTRY

THAT FINE OLD SPIRIT IS NOT DEAD

It is this spirit that has made possible the marvelous growth of the South—unparalleled in the history of the country. And it is this same spirit that will make for a continuance of

THE SOUTH'S DEVELOPMENT

We are prepared to help.

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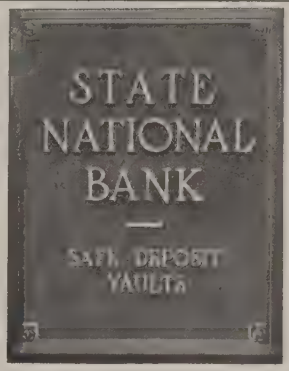

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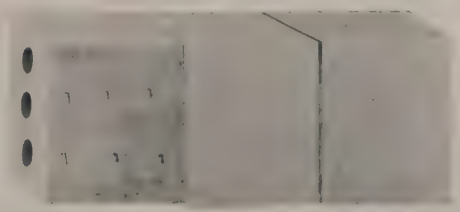
STRYKER FIBER BUILDING BLOCK

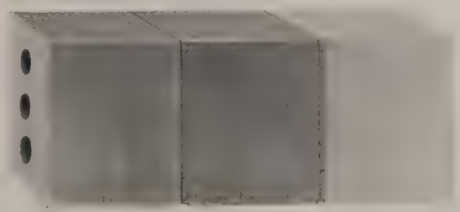
For Exterior Walls and Interior Partitions
Fire-Proof, Sound-Proof, Strong, Durable

Can be sawed; takes and holds nails the same as wood. Paint, Cement, Plaster, Stone-coat, Stucco, etc, adheres to it and will not check or crack off.

Sizes: 12″ high x 30″ long x 3, 4, 6, 8″ thick. *Will stand rough usage and handling*



Nails Driven into Block — Sand finish in marble for outside Finish — Pebble Dash in broken granite for outside finish.



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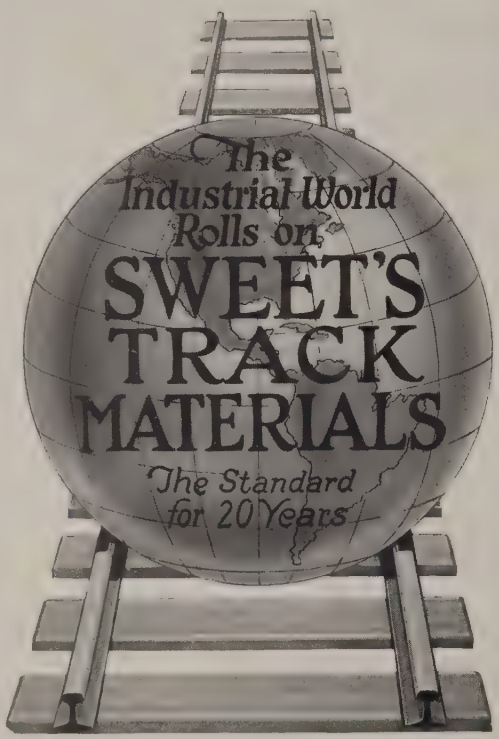

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Rebuilt Locomotives, Narrow and Standard Gauge, 5 to 100 tons in weight. Freight and Passenger Cars. Contractors Equipment, Dump Cars, Steam Shovels, Locomotive Cranes, Relaying Rails, etc.

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Photograph of Well Drilled for City of Dublin, Ga.
Flows 650 Gallons Per Minute

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ANYWHERE
ANY SIZE
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THROUGH ANY FORMATION. PUMPS furnished and installed which will give satisfaction and work most efficiently. AIR LIFT Pumping Systems furnished and installed. TWENTY-SEVEN YEARS' EXPERIENCE at your service.
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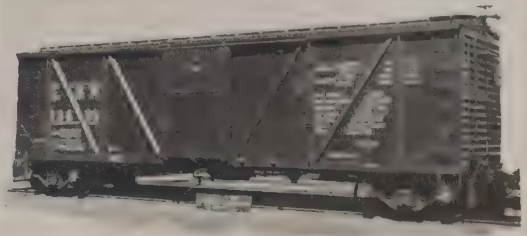

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SPECIAL SHOP WITH MACHINERY
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CAPACITY PER YEAR
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CROSS TIES, SWITCH TIES, POLES, CROSS ARMS
OAK AND PINE CAR STOCK
Creosoted Materials of all kinds
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All Relaying Material Guaranteed and Shipped Subject to Approval at Destination

New Portable Track
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Webster machinery displaces man power in moving materials from place to place. Loading and preparing coal at the mine; handling coal and ashes in industrial plants; chemicals in process; grain in and out of elevators; barrels, boxes and bales of merchandise at the factory or warehouse. Wherever there is material to be handled, either bulk or package, there is a type of Webster Equipment that will cut your handling costs and do the work quicker and without breakage or waste.

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"MICHIGAN" COMBINATION STEEL AND WOOD PIPE *for* WATER SUPPLY

9 MILES 8-IN. INSTALLED AT BUFFALO, OKLA.

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Write for Catalogue

Michigan Pipe Co. BAY CITY MICHIGAN

SOUTHERN SALES OFFICES.
Empress Theatre Building, Oklahoma City
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Ohio Lifting Magnets

THE cut shows a 55-inch Ohio Magnet lifting large press scrap in the new, modern yard of the David J. Joseph Company at Youngstown, Ohio.

This yard has an area of five acres covered by two runways each 1,000 ft. long, one 65 and the other 75 ft. wide, and served by five 7½-ton Morgan Mill Type overhead cranes and by two 28-ton locomotive cranes.

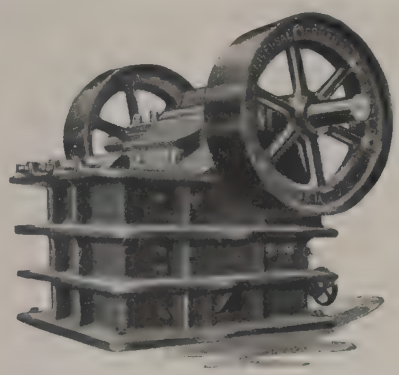
There are seven magnets, of which five are 55-inch Ohio Mill Type, and it is estimated the yard can easily handle 4,000 tons in and 4,000 tons outbound per week.

Consider the low cost per ton for handling scrap with such a splendid plant.

THE OHIO ELECTRIC & CONTROLLER COMPANY

CLEVELAND, OHIO

Representatives in principal cities



Steel Rock Crushers

For Every Purpose

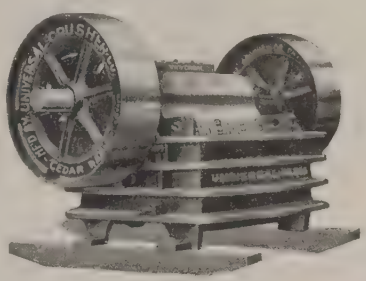
UNIVERSAL CRUSHERS are recognized everywhere for their efficiency, dependability, ease and economy of operation. Behind them are twenty years of manufacturing and designing skill. They are unexcelled for the production of large quantities of either fine or coarse crushed stone and gravel. The cut at the left shows our large opening STEEL crushers built for heavy duty in *six sizes; 12 x 20", 12 x 24" and 12 x 36"* for boulders, traprock, etc.; *15 x 20", 15 x 24"* and *15 x 36"* for granite, limestone, etc.

Capacities 10 to 40 tons per hour

The illustration at the right shows our GRAVEL and REJECTION crushers. These machines meet the popular demand for a crusher that will produce large quantities of fine crushed stone or gravel for road surfacing. Will crush to pass a 1" ring.

Standard equipment on all machines includes: Reversible Manganese Steel Jaws, Heavy High Carbon Steel Shaft, Bronze Bearings, Ring Oilers, and quick adjustment for setting the jaws to produce either fine or coarse material.

Mounted or Unmounted. With or without Elevators.

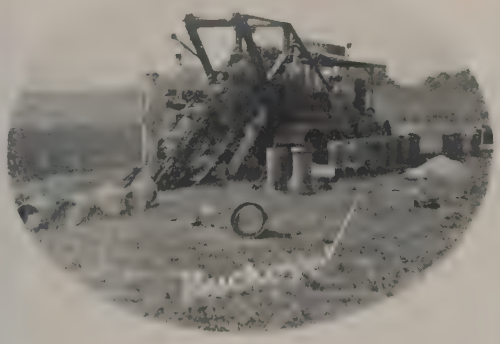


8x10" 8x12" 8x16"
8x18" 8x24" 8x36"

Universal Crusher Company

627 C Avenue, W. CEDAR RAPIDS, IOWA, U. S. A.

Write us your requirements

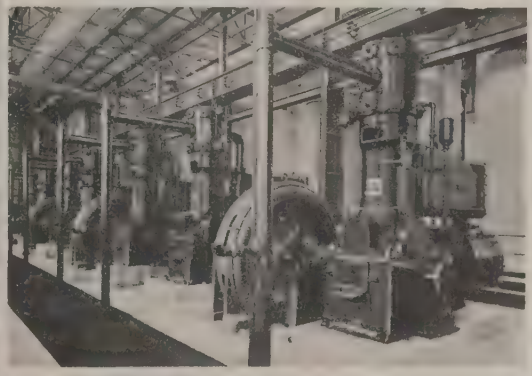


TO make possible the rapid construction of sewers, water and pipe lines for all purposes has been Buckeye's part in the development of the South. As a result, Buckeyes are famous for good work well done, at low cost.

The Buckeye Traction Ditcher Co.

FINDLAY, OHIO

Manufacturers of Trench Excavators (both Wheel and Chain and Bucket Types), Pipe-Line Trench Excavators, Tile and Open Ditchers, Back Fillers, Pipe Screwing Machines, Curb Diggers and Clay Diggers



73 YEARS SOUTH

For nearly three-quarters of a century Sullivan mining and quarrying equipment have aided in the development of the South's natural resources.

Where coal, ore rock are dug, or compressed air power used, SULLIVAN can render useful service.

Southern offices at Knoxville, St. Louis, Birmingham, Dallas, El Paso, etc.

[The picture shows Sullivan Air Compressors at Air Nitrate Plant No. 2, Muscle Shoals, Ala.]

SULLIVAN MACHINERY COMPANY
122 S. Michigan Ave. Chicago

IN STEP WITH

Southern Progress

For a Quarter of a Century this Southern institution has kept step with the progress of the South.

Regardless of size Street can successfully solve your hoisting problems.

For this job, one of the world's largest construction projects for 1924, the L. E. Myers Co., Chicago, used Street Cableways exclusively. Besides eleven Cableways all new hoists and derricks used for the construction of the mammoth Dix Dam at Burgin, Kentucky were furnished by

Street Bros. Machine Works
Manufacturers of
Hoists, Derricks, Cableways
Log Skidders and Loaders
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"The Dynamo of Dixie"

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The Adamson has been sold in 42 States and Countries

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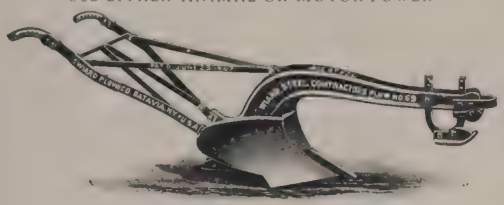

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We build a complete line of Road and Contractor's Plows, also Farm Plows and Tillage Tools

Dealers and Distributors Everywhere

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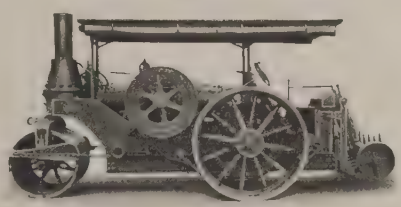
"OLDEST PLOW BUILDERS IN AMERICA"

BUFFALO-SPRINGFIELD ROLLERS

A FACTOR IN THE DEVELOPMENT OF THE SOUTH



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OPERATING from the entire production of the Woodward Iron Company, both at Woodward and Vanderbilt Furnaces. Producing sized and screened slag meeting Federal and State Aid specifications. Air cooled, non-glassy and non-porous material of superior quality for all concrete construction. Two Plants—Capacity 1800 to 2000 tons per day.

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Wagons and Trailers *for* Every Need
CAPACITIES FROM 1½ TO 15 TONS

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Whether your motive power be teams, trucks or tractors we can serve you and solicit your inquiries.

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Manufacturers of
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HIGH PRESSURE BOILERS
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SPECIALIST IN BUILDING
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IN 1900 the South expended over $35,000,000.00 on her public schools. Twenty years later she spent nearly $205,000,000.00. These figures represent imposing milestones in the South's progress. Incidental with this educational development the South has kept pace with modern methods by rural school consolidations and bus transportation, providing the children with the very best educational opportunities. A few years ago, children trudged to school over dusty or muddy roads. Then came the horse-drawn carry-all. Later, the side-curtained motor bus. Today, the big enclosed bus carries them more safely; more comfortably. The Carolina Body Company answers this need for safe, comfortable and efficient school bus bodies with a completely equipped body-building plant in Greensboro, North Carolina, one of the finest factories of its kind in the South, containing every mechanical facility, employing skilled body-builders and engineers, and directed by men whose sole purpose is to build the best bodies that superior designing, workmanship and materials can produce. A quick service is offered such as only convenience of location and a competent organization can give.

School officials are invited to write for an interesting folder entitled the "Evolution of School Transportation."

We are also manufacturers of the De Luxe, 25 Passenger, Pay-Enter type of bus bodies for public service companies. This body is a masterpiece in design and construction. It contains every feature of convenience and equipment for durability and low-cost transportation. It is a beauty, designed in collaboration with public service company engineers. The best features of all similar bodies are augmented with individual refinements and improvements, making it the last word in a public service bus. All parts are standardized so that quick replacements can be made if ever necessary.

If you are in the market for a truck body for any commercial use, consult us with the understanding that you incur no obligation.

Carolina Body Company

GREENSBORO, NORTH CAROLINA

Kyrock

the Original and Standard Kentucky Rock Asphalt

The remarkable development of Kentucky Rock Asphalt in the last few years has been due to the uniform high quality of the rock asphalt produced by this company and its care in seeing that KYROCK pavements are properly constructed.

There are many deposits of rock asphalt in Kentucky but not all of them are suitable for pavements. KYROCK is the original rock asphalt coming from the same deposits as the material used in the old rock asphalt roads and streets which have been thoroughly tested by time and traffic.

KYROCK is laboratory tested at every stage of its production to assure a uniform mixture of bitumen and sand. No bitumen or other materials are added.

A competent staff of engineers, throughly experienced in rock asphalt construction, keeps in constant touch with all KYROCK work, co-operating with the local engineer and contractor to the end that all KYROCK pavements may be satisfactory.

KYROCK is laid cold on any standard base sufficient to carry the traffic. It is used extensively for surfacing old macadam, brick, asphalt, concrete and gravel roadways. Shovels, rakes and roller are the only equipment needed

In planning their 1925 paving program, engineers and officials should consider KYROCK. Specifications for KYROCK construction will be furnished on request.

Engineers who are planning rock asphalt construction should insist on KYROCK. It insures high quality, uniformity, service and the responsibility of the oldest and largest producers of Kentucky Rock Asphalt. Write for booklet M. R.

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Dredging Contractors for all classes of River and Harbor Improvements, Deepening Channels, Hydraulic Filling and Rock Work.

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Sand and Gravel via Truck or Rail or Water Delivery from Baltimore, Md.

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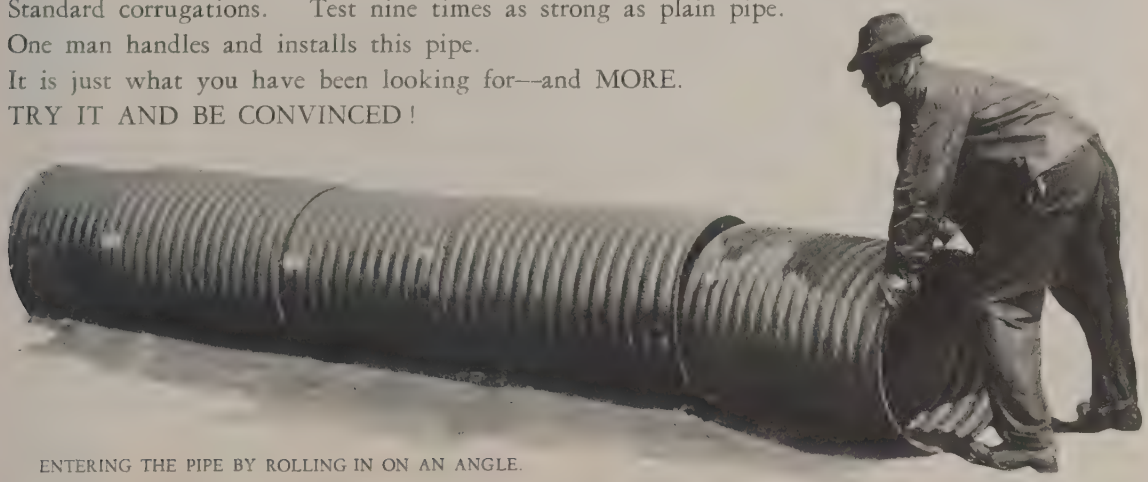
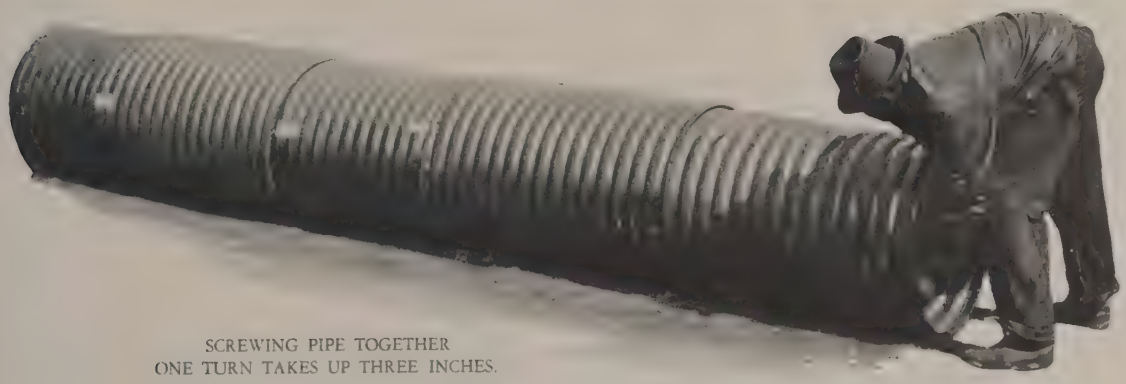


ENTERING THE PIPE BY ROLLING IN ON AN ANGLE.



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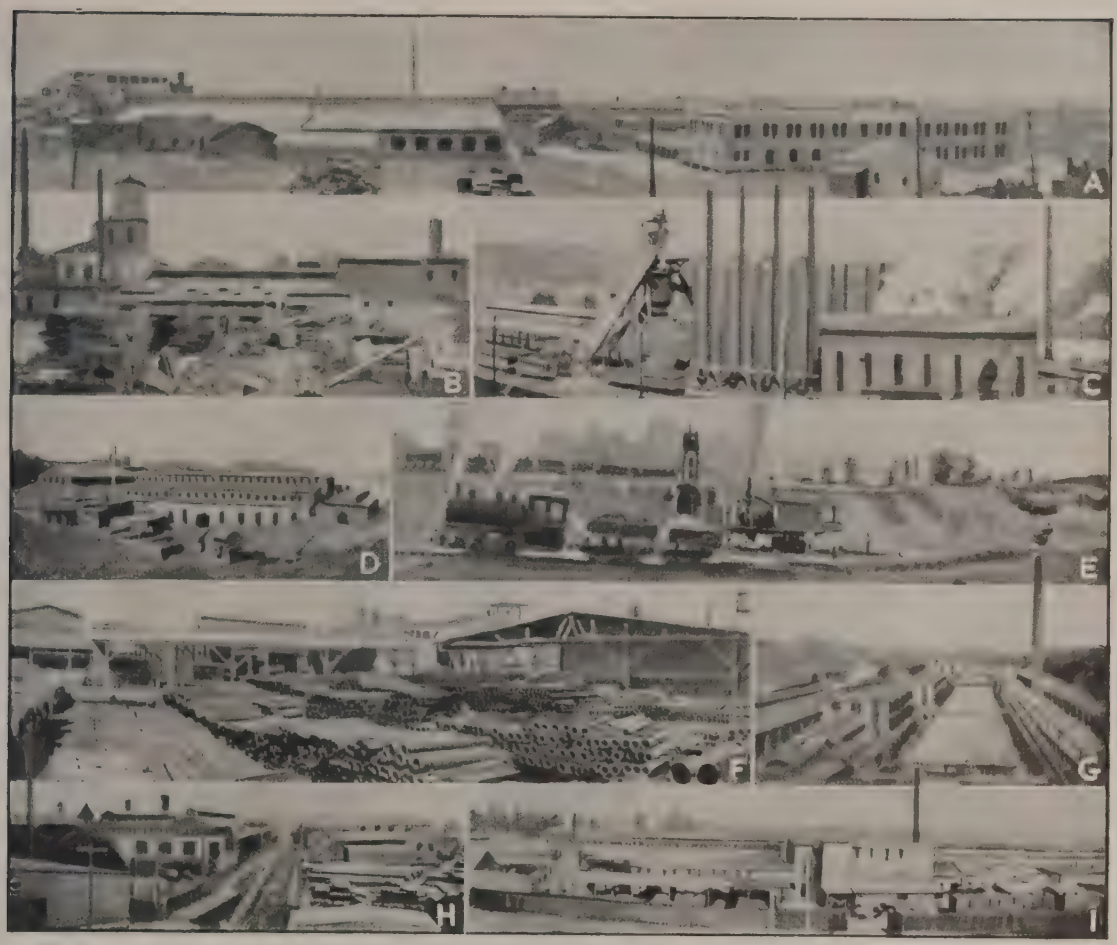

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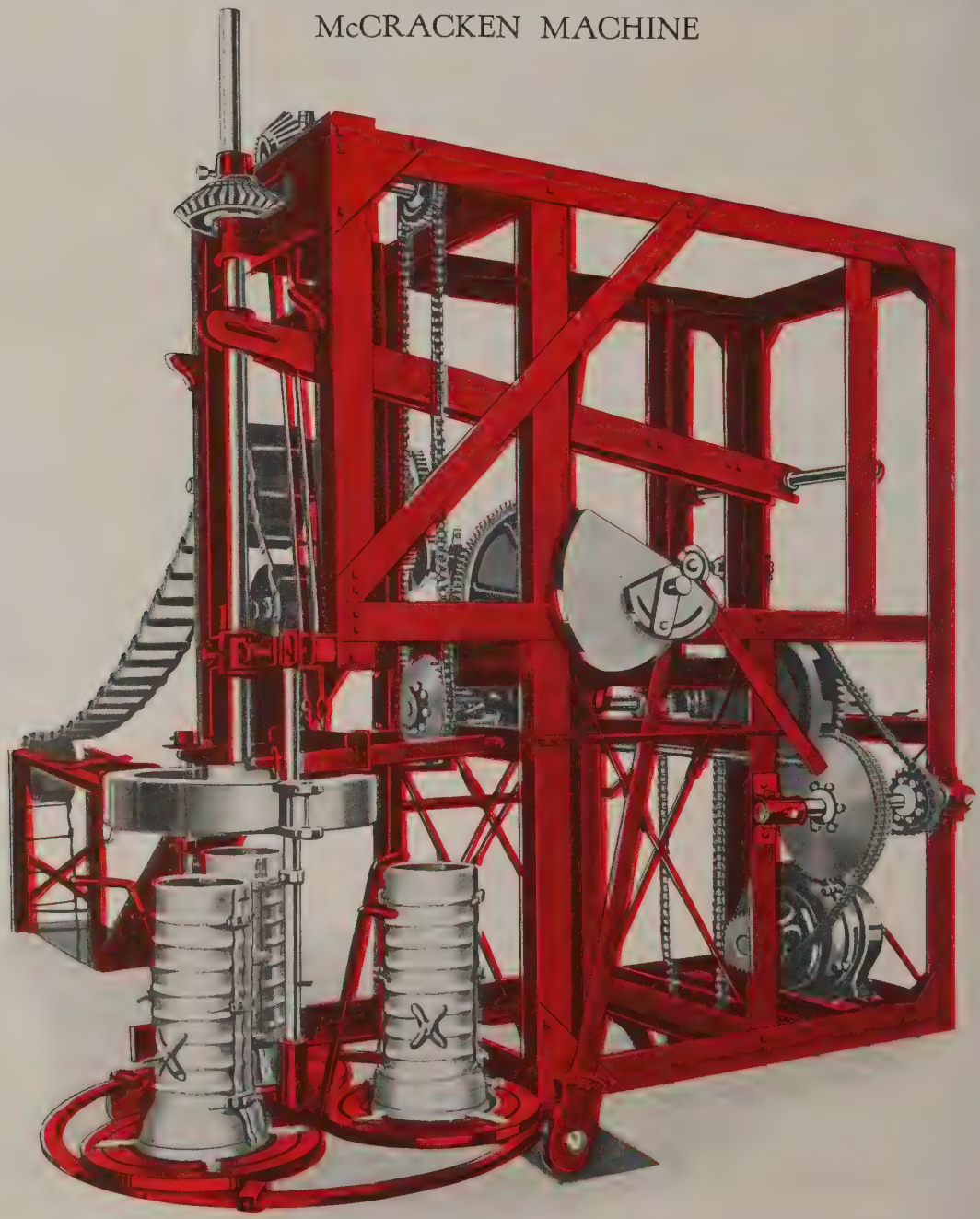

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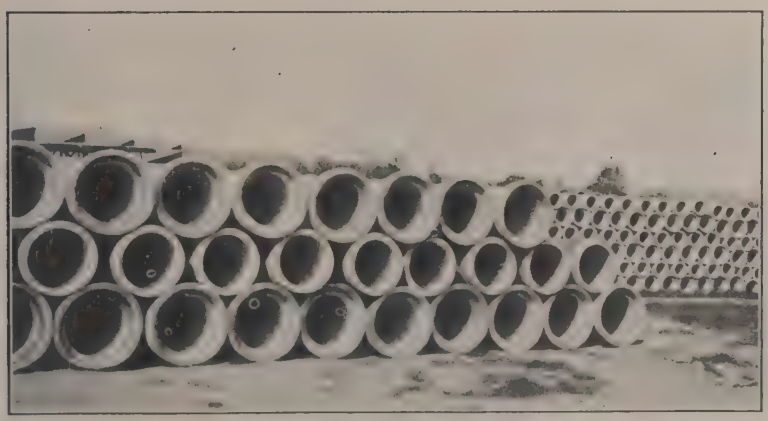

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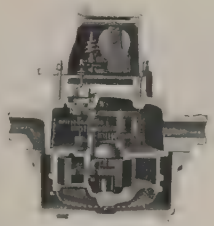

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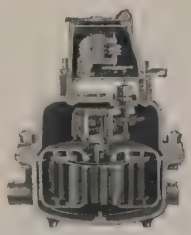

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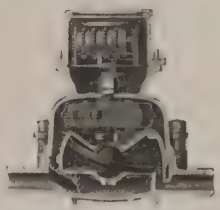

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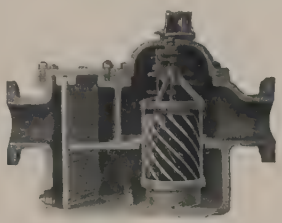

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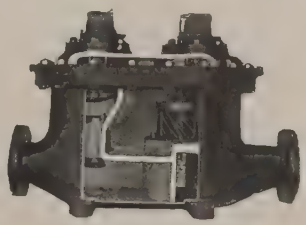

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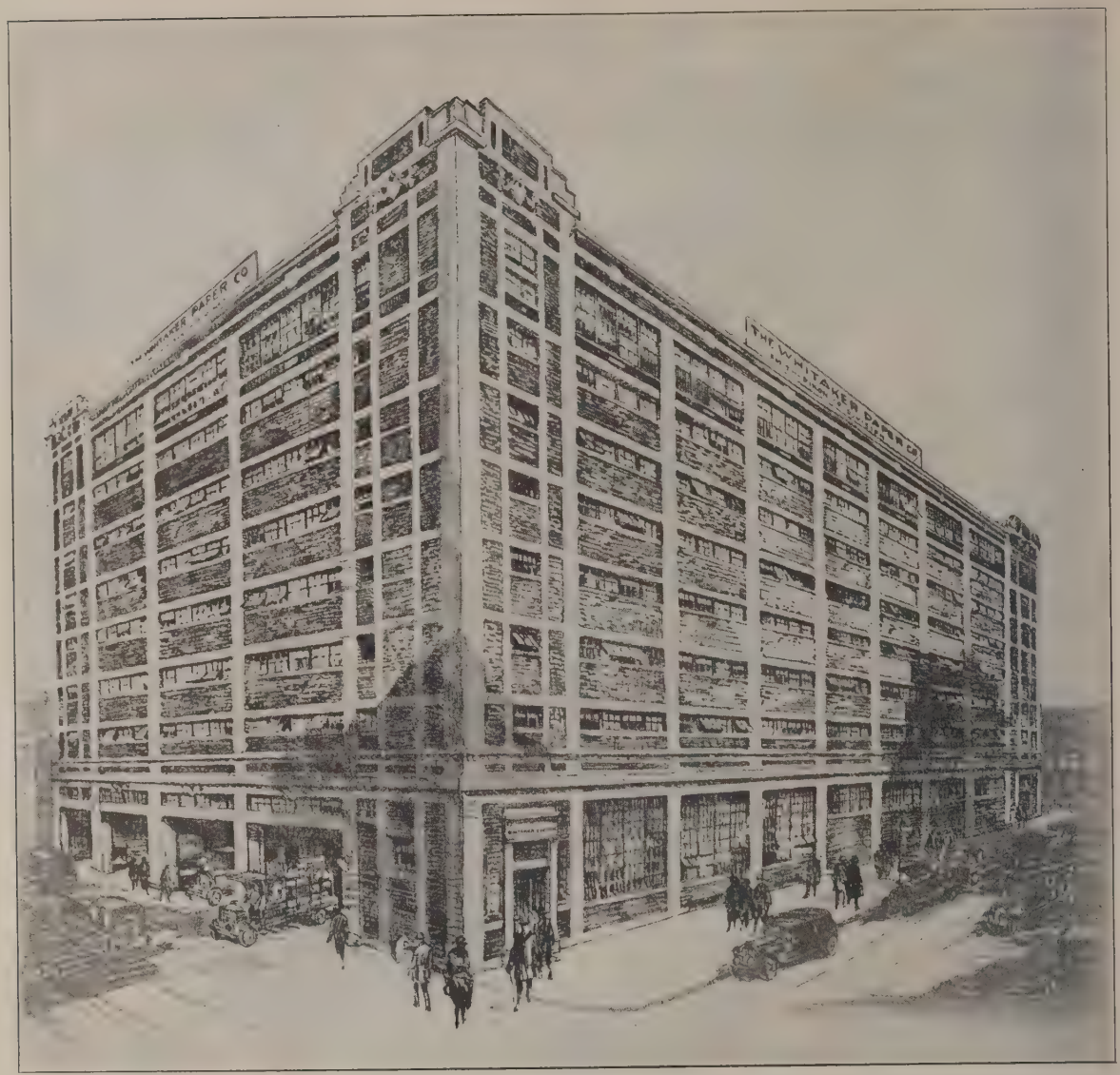

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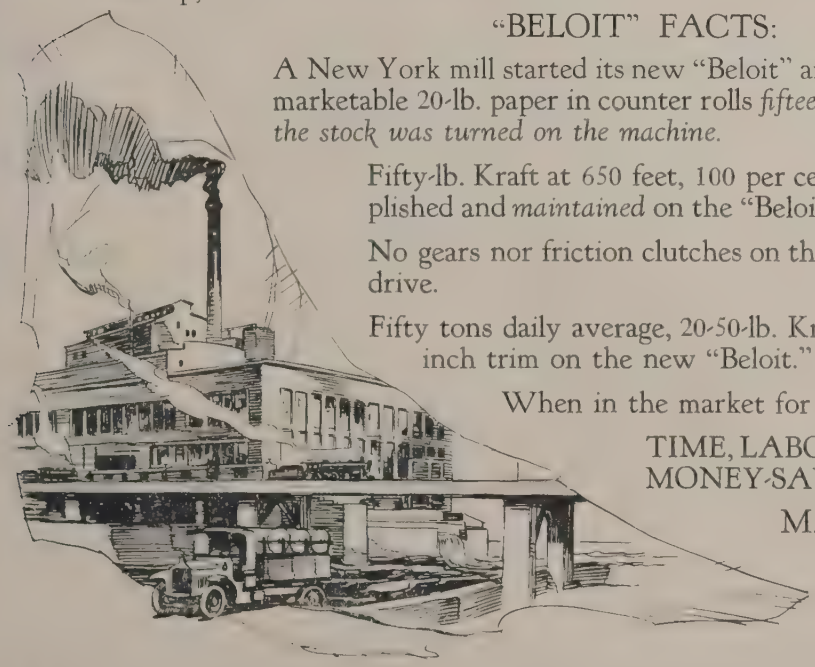

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